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An Address
ON
MENTAL UNITY AND MENTAL DISSOCIATION.*

BY WILLIAM BROWN, M.D. OXF., D.SC., M.R.C.P. LOND.,
WILDE READER IN MENTAL PHILOSOPHY IN THE UNIVERSITY OF OXFORD; PSYCHOTHERAPIST TO KING'S COLLEGE HOSPITAL, LONDON; HON. CONSULTING PSYCHOLOGIST, BETHLEM ROYAL HOSPITAL, LONDON.

IT is important to realise that the problem of mental unity and dissociation is in direct relationship to the problem of unity and dissociation in the physical and physiological spheres. The point of view from which we should first approach it is that of biology. The general tendency throughout evolution seems to be towards the building up of totalities or wholes, in which each separate activity takes place in relation to the whole. The general conception is not that of a purely mechanistic scheme in which we begin with particles of matter and consider how they interact with one another to produce a more and more complex system, but one in which there is a guiding unity from the beginning. We may indeed, as metaphysicians, assume that there is a guiding unity of the entire universe. But short of such an ultimate generalisation we find that observation itself reveals this tendency towards a progressive development and multiplication of unities, in relation to which individual activities occur.

1. BIOLOGY AND PSYCHOLOGY.

In one sense, biology may be regarded as the most fundamental of the sciences, and even the simpler physical and chemical activities occur as parts of systems, which may be likened to organisms in having an environment to which their reactions are adjusted. This biological point of view needs for its completion the psychological point of view, which is not something distinct from the biological, but a continuation of it. Psychology is a completion of biology as a science, and gives further meaning to it. The unity of the organism becomes more intelligible when we think of it as a mental, and in part a conscious unity. It is a unity in plurality. Physically, the organism is a unity of parts in spatial relation to one another; psychologically, it is a system of mental tendencies in relation to one another. What we find physically is a reaction to an environment in the form of reflex action, simple or conditioned. Psychologically, response to external stimulation is the satisfaction of conation, and, at higher levels, satisfaction of desire, &c. Biologically, it is the struggle for existence, with all that this involves. Psychologically, it is a conscious striving first of all for something that the individual does not know—towards a goal which he gradually realises, gradually learns to understand as he achieves it or fails to achieve it. However helpful the biological concepts of tropisms and conditioned reflexes may be as explanatory factors, the psychological point of view throws further light upon the situation. The ultimate factor that has to be considered is something that is *purposive*—a general striving—which factor has to be assumed in order that the theory of conditioned reflexes will work.

2. NORMAL AND ABNORMAL DISSOCIATION.

Unity of mind, then, is something which develops. In its general form it is there from the beginning, but it only exists in relation to a multiplicity. There is a one-and-many relationship from the beginning. Moreover, the individual himself is, to some extent, an abstraction. He belongs to a species. He has a history, and his history is, in part, the history of the entire species. The history of the species is part of the history of organic evolution, and the history of organic evolution is part of the history of the Universe—if, indeed, we may think of the Universe itself as having a history. But within the individual experience there are partial activities that may struggle with one another just as individual members of a species may compete with one another, and in this nisus or striving towards more complete unity and greater complexity and more adequate adaptation to environment, the process of dissociation shows itself as essential and normal. Right from the beginning we must realise that dissociation is just as normal and necessary as association. The mind as it grows must be able to reject, and also must be able to segregate one activity from another. Different activities must be insulated from one another to a great extent within the organism, just as in an electrical machine there must be insulation of the wires. This insulation is what is meant by normal dissociation or disjunction. And from the pathological point of view there can be disturbance in both respects—disturbance of association and disturbance of dissociation. Experiences may become associated in such a way as to blur the clearness of vision of the individual as regards appearances and values, just as, more obviously, dissociation may go beyond its proper function and tend to destroy the unity or totality towards which normal striving is directed.

3. THE NATURE OF MENTAL ASSOCIATION.

The earlier associationist doctrine of psychology was unsatisfactory because, among other things, it failed to distinguish between the process of experiencing or the act of experiencing, and the content or object of experience; and its aim seems to have been to describe the mind as a sort of mosaic of contents of experience joined up to one another according to the laws of association by contiguity and similarity. But association is primarily between the acts of experience. These acts of experience are differentiations of the fundamental striving—that which Spinoza called the *conatus in suo esse perseverare*, "the striving to persist in one's own being." This striving has an object. There is always an object—the environmental changes which the individual has to face—and corresponding with the complexity of the environment there is a complexity developing within this general striving, forming a complex system of conations. This conation involves the two other well-known aspects of cognition or awareness, and of feeling-tone. Associationist psychology erred in failing to allow due weight to the conative side, and in attempting to range the different kinds of feeling on a level with the different kinds of objective experience. But even according to the associationist scheme, dissociation or disjunction was necessary for a complete explanation of normal mental activity. Side by side with the principles of association by contiguity and similarity, there was the principle of dissociation by varying concomitance. Only by such a principle could the important processes of discrimination, comparison and abstraction be brought within the circle of associationist doctrine. The general scheme of explanation was wrong, in that it dealt with contents of experience when it should have been dealing with acts of experience; and the general scheme of mental activity which we put in the place of this associationist scheme is that of systems of mental tendencies included within, and in subordination to, a wider system—tendencies towards knowledge and action, and involving feeling. One such system of explanation is that in terms of instinctive-emotional dispositions organised within sentiments, with the sentiments in their turn subordinated to one all-inclusive sentiment or master-interest. A sentiment is an organisation of emotional dispositions centred about the idea of some object. What are organised are not the presentations or representations, not the contents of experience

* Presidential Address to the Section of Psychology of the British Association at the Leeds Meeting. The paper was supplemented by descriptions of cases illustrating mental dissociation.

primarily, but the processes or acts of experience. The tendencies of experience, and the activity and organisation of these tendencies, bring with them an organisation of the objects; and so our memories, which are retained and which are used for the retention of past experiences, fall into systems because the acts of experience corresponding to those memories fall into systems. And from that point of view we see that the dissociations of memory—the gaps in the memory continuum, known as amnesias—find their true significance in the segregation of corresponding acts of experience.

The question then arises, if we reject the associationist scheme according to which the mind is built up of presentations and representations cohering together in systems, are we to regard the unity of the mind as an aggregation of mental activities and tendencies? Are we to put in place of our mosaic of mental contents a collection or a colony of mental tendencies? The reply is "No," because we do not have these mental tendencies separate from one another—just coming together and cohering, just as we do not have the mental contents coming together and cohering. Both subjectively and objectively, we must assume at the beginning a generalised striving and mental tendency, with a generalised objective—e.g., "the great big buzzing confusion" of which William James speaks as the world of the new-born babe—a continuum of sensation and movement on one side, and a continuum of mental striving on the other. The general mental striving which we assume at the beginning becomes gradually differentiated in relation to the needs of the organism, and the demands made upon the organism by its environment—a differentiation superimposed upon the differentiations accumulating in the history of the race, and handed on from generation to generation in the form of instinctive endowment and inherited aptitudes. The individual inherits not only separate instincts, but also the tendency towards an organisation of those instincts. He inherits the beginnings of sentiments, as well as instincts. He is already a one-and-many unity, with his mind a plurality of part-tendencies and processes, and his task in life is to carry that organisation to a higher stage. The demands made upon him by his environment bring with them movements in two directions—in the direction of greater unity and greater organisation, and also of greater complexity—a greater degree of differentiation and discrimination. Discrimination is necessary because he has not only to accept, but also to neglect or reject, and this neglecting or rejecting involves dissociation, just as acceptance involves association.

4. THEORIES OF PATHOLOGICAL DISSOCIATION.

As regards dissociation in pathological cases, the writers of the last generation thought of this in terms of associationist psychology, and in the doctrine of Prof. Pierre Janet one finds that standpoint still apparent. In his description of cases of hysteria and multiple personality, he implies a general background of explanation, according to which personality may be regarded as a synthesis of mental presentations some of which can be split off from the main mass. This view is similar to the colonial view of personality which we find in the writings of Ribot. But if we remind ourselves of the fact that experience involves an act of experiencing, we see that the situation is rather different. The power of recall is an essential aspect of conscious memory. On the other hand, unconscious memories are unconscious or latent mental activities directed towards past events. They are not passive, but involve a certain amount of mental energy. And so we pass from Pierre Janet's theory to the theory of Prof. Sigmund Freud, and we find that the dissociation which is taken as a fact in Janet's theory is explained in Freud's theory in terms of mental conflict and repression. These memories become inaccessible to the individual because the mental tendencies corresponding to them are in conflict with other tendencies of the individual and incompatible with his more fundamental interests. So they are extruded by an active process of repression—they are barred from consciousness.

That process of repression and extrusion, though pathological in these cases, need not be necessarily so. We must not look upon extrusion itself as essentially pathological. It is because we have restricted the word dissociation so much to the pathological side that we find it so incomprehensible to us. It is because we have thought too much in terms of mental unity that cases of multiple personality seem to be inexplicable. Actually the most normal mind is a multiplicity. We are all many selves. We have to face the world from many different angles. We have many different interests. Interests in the most normal mind may conflict and be incompatible with one another. And it is a condition of mental health that such conflict can be resolved by elimination or by a higher synthesis. What makes the dissociation of multiple personality pathological, is that the elimination is not complete—that dissociation in normal mental activity is a successful rejection, and that dissociation in a pathological case is unsuccessful—is an incomplete and therefore an unsuccessful rejection. A tendency that is pathologically repressed is, as it were, rejected and accepted at the same time—rejected by clear consciousness, but still clung to by the mind.

It is misleading to look upon the problem of mental dissociation and multiple personality as something standing by itself, as if we understood mental unity and were perplexed by the appearance of multiplicity. Multiplicity is an aspect of the normal mind, just as much as unity is, and unity needs explaining just as much as multiplicity does. Those two problems must be solved together, and kept in relation to one another all through.

5. MULTIPLE PERSONALITY.

Many of the classical cases of multiple personality are fully explained along these lines. They are cases of alternating personality with reciprocal amnesia, as it is called, in which each personality is unable to recall the experiences of the other. The two individuals A and B alternate with one another. A has his own system of memories and, when he disappears and makes way for B, B has his system of memories distinct from the memories of A. We may explain this in terms of two general systems of interests which are mutually incompatible and in conflict with one another. As a rule, one part of the personality is more fundamental—i.e., more stable, than the other. But difficulty arises in cases where one personality is shut up within its own memories and experiences, while the other personality has access to those memories as well as to its own. A may have his system of memories but be quite ignorant of B, except from indirect evidence, whereas B not only has a special set of memories, but also has direct knowledge of A's memories, thoughts and feelings. This is a difficult problem which needs to be faced. We find an analogous, though not identical, situation in most cases of deep hypnosis. When a patient passes into the hypnotic state, he may remain fully aware of his waking consciousness, and may have free access to the memories of his waking self. But on awaking he does not, as a rule, remember his hypnotic experiences. The relation is a one-sided one. The hypnotic personality is acquainted with the waking personality, and all its memories, but the waking personality is not acquainted with the hypnotic personality. The range of the hypnotic personality is wider than the range of the waking personality. This similarity between one-sided multiple personality and the hypnotic personality is significant, when we remember that such cases have been investigated by the hypnotic method. Pierre Janet, Morton Prince and others used the hypnotic method in studying cases of multiple personality, and the criticism has been made against them that in doing so they were manufacturing personalities—that the personalities were artefacts produced by the method. Everyone

recognises that these investigators are psychologists of exceptional ability and circumspection and honesty of purpose, thoroughly trained and alive to the possibilities and difficulties of their method. We cannot dismiss their observations as false observations, or as misunderstandings on their part. But we must nevertheless allow for the influence of the process of hypnosis in the result, and as contrasted with that earlier period of investigation—the hypnotic period in psycho-pathology—we find that, now that hypnosis is seldom used and has been replaced by deep analysis, cases of multiple personality are not on record. The psycho-analysts to-day seem to have no such cases to report. Moreover, if we contrast the very large number of cases of severe nervous disturbance caused by the late war with the absence of cases of multiple personality there, we may become still more impressed by the argument that it was the persistent use of the hypnotic method that was mainly responsible for the complexity of most of the earlier cases reported.[1]

The movement of thought is always towards system and unity. Thought abhors hard-and-fast distinctions. Thought is baffled by cases of multiple personality because they are so different from the ordinary cases of everyday life. If we can build a bridge between one group of cases and the other, then we may feel that we are likely to have not only a more satisfying but a true explanation of the situation.

We must therefore approach the question of dissociation from the normal side—as manifested in a relatively normal mind. No mind is completely normal, since no mind completely solves its problems from day to day, and it is the failure to solve mental problems which is one of the general causes of the symptoms of psycho-neurosis and mental disease. Dissociation and multiple personality are not to be contrasted with association and mental unity. Pathological dissociation should be contrasted with the dissociationist processes of the normal mind. It should be regarded as a failure of the normal process of dissociation.

6. AUTOGNOSIS INCREASES MENTAL INTEGRATION, HYPNOTISM MAY DIMINISH IT.

The unity of the normal mind, although it is there from the beginning, is a striving towards a more and more complete association; it constitutes an urge to a greater and greater degree of completeness of systematisation and inclusiveness, but it is never really complete. In the most normal mind there is a falling away from complete unity. There is in the activity of this unitary mind not only a normal process of disjunction or dissociation, but also a certain degree of abnormal dissociation. In cases of multiple personality this abnormal dissociation has become so pronounced as to be apparent to the whole world. The process of deep analysis or psycho-analysis fails to reveal cases of thorough-going multiplicity, and the reason is that the process itself is a process of unification. As the individual is being analysed, the failures of adaptation in his past life are cleared up, so that his mind is enabled to work more and more normally. Analysis is not a good term for this process. It is more than analysis, it is a process of self-revelation or *autognosis*. The individual learns to know himself better, and in the process of analysis there is actual development of the mind going on. There is a development in the direction of the normal and the unitary. Any dissociation that is encouraged by the method is a normal dissociation, not an abnormal dissociation. It is only another expression of the same truth when we say that repressions are overcome in the process of analysis, because repressions are pathological dissociations—dissociations that are not complete and not thorough going.

In contrast with this process of autognosis, the process of hypnotic investigation carries with it a tendency to abnormal dissociation. A person who is easily hypnotised is a person who is already, to some extent, dissociated; in hypnotising him we take a wedge, as it were, and drive it into his mind and split him up still more. No wonder the results give us an appearance of dissociation; but it would be very dangerous for us to take these results at their face value and draw inferences from them as to the structure of the normal mind, or even of the mind of the person we have been experimenting with. This general line of criticism seems valid as against such a theory as that of Prof. W. McDougall in the last chapter of his "Outline of Abnormal Psychology," in which he works out a theory of the Self as a system of monads which form a hierarchy, in which there is one dominant monad, the conscious self, and a whole number of subsidiary monads that are, in a normal mind, adequately subordinated to the chief monad and are in relation to the chief monad through telepathy[2]; but in a case of multiple personality one of these subsidiary monads may break loose and become insubordinate. This is an ingenious theory, and it may be true, but in the present state of our knowledge it would seem to be a case of explaining *obscurum per obscurius*. Telepathy may be a fact, but it is something about whose *conditions* we know next to nothing, and therefore not very suitable to take as a fundamental factor in an explanation of the working of the mind.

The mind can act at different levels on different occasions and under different circumstances. In many of the classical cases of multiple personality, the subsidiary personalities represent a regression to more juvenile forms of behaviour and of ethical valuation. This is clearly apparent in "Sally Beauchamp" of the Miss Beauchamp case, and in the "B" personality of the "B.C.A." case (Morton Prince). Such manifestations are not accurately described as "split-off" personalities. Indeed, any spatial metaphor is inappropriate. In other cases the tendency to dramatisation, natural to the human mind, may play an important part. Mutually incompatible ideas of character may be simultaneously or alternately aimed at, and identifications in early life, based on love and admiration for relatives, &c., may introduce incompatibilities which reveal themselves under circumstances of stress in later years as the grounds of pathological dissociation.

7. AB-REACTION AS A METHOD OF OVERCOMING MENTAL DISSOCIATION.

As regards the problem of the *removal* of pathological mental dissociation in hysterical patients, much was learnt from the wide range of cases dealt with during the war. While treating shell-shock cases in the field in France, I found that a large proportion of the cases showed a more or less extensive amnesia for events that had occurred immediately after the shell explosion. These patients were easily hypnotised, and under light hypnosis the lost memories could be immediately restored. But I soon discovered that if I recalled at the same time the terrifying emotion that had originally belonged to these experiences, there was a tendency for the accompanying hysterical symptoms—deafness, mutism, tremors, paralysis, contractures, &c.—to disappear spontaneously, without the necessity of giving explicit suggestions to this end. The more complete I made the working-off of the emotion, or the "ab-reaction," to use Breuer's original term, the more complete was the recovery. In cases seen by me previously in England, I had also restored lost memories by light hypnosis, but had not produced intense emotional revival and had not seen collateral symptoms disappear. But again, towards the end of the war, I was seeing more chronic cases in Scotland, and then found that amnesias of longer standing could be cleared up with accompanying ab-reaction of the

[1] Cases of extensive amnesia, fugues, &c., were numerous during the war: but the first aim of the army doctors in the battle areas was to remove these amnesias and reassociate the patients as quickly as possible, so that the latter might be either returned to the line or sent down to the base with the minimum of delay.

[2] Unlike the monads of Leibniz, which "have no windows," and are in a relation of pre-established harmony.

emotion of fear; and that with the ab-reaction there was observable that tendency for the collateral symptoms to disappear at the same time, such as I had observed so frequently in France.

These are observed facts, and I endeavoured to show in a paper some years ago[3] that they could be explained in terms of a theory of reassociation. The amnesic patients fresh from the trenches showed a two-fold dissociation, namely (1) a dissociation of the memory of events immediately following upon the shell explosion from memories of earlier and later parts of the patient's life; and (2) a dissociation of these memories, as mere intellectual awareness, from the accompanying emotional reactions of fear—tremors, sweating, mutism, paralysis, &c.—which are of a physiological nature. The physical reaction of fear, thus dissociated from its psychical counterpart, had become relatively permanent instead of being transitory. The patient no longer felt the emotion of fear—at least, of just that fear which the shell explosion had aroused—but did show its physical manifestations in the form of hysterical symptoms. By re-arousing the whole of the lost experience in all its emotional vividness I overcame *both* dissociations. The physical manifestations became linked up with their psychical counterpart, and this in its turn was linked up with earlier and later memories of the patient's life. In this way the mind was completely resynthesised, and the physical symptoms came once more under the sway of the entire mind (the complete personality) and could disappear.

In addition to ab-reaction, I advocate the thorough thinking out of the whole psychological situation by the patient, so that he may be brought eventually to understand himself adequately. This is the process of autognosis, or self-knowledge. The patient is encouraged to obtain as objective a view of his entire mental condition as is possible.

8. AB-REACTION AND TRANSFERENCE.

C. G. Jung[4] has explained the beneficial effects of ab-reaction in terms of "transference." By transference is meant the emotional rapport (conscious and unconscious) which springs up between patient and physician, and which enables the patient to live again, in the course of an analysis, through earlier experiences of his life in relation to the physician, and thus become freed from their harmful effects. The following case illustrates how ab-reaction can bring benefit without the factor of transference coming in. It is a case of a man of considerable education, who had for some years suffered from obsessive fear, the origin of which he could not fathom. He would wake up in the morning with this fear weighing upon his mind. After reading about the method of ab-reaction, as used in treating shell-shock patients, he thought that he would try to cure himself by a similar method. He endeavoured to recall earlier and earlier memories of his past life, using the method of concentration—to all intents and purposes producing a light degree of self-hypnosis. At length he seemed to get this memory: it was half a memory, half a waking vision. He seemed to be in a sort of native compound in India. He experienced intense heat, such heat as he never remembered experiencing in his life before, and seemed to see a black kid lying on the ground with its throat cut and blood pouring out of the wound. He felt intense terror as he went through this experience. This terror grew and grew "like a bubble." It got bigger and bigger and at last burst, and all at once the fear began to subside again and eventually disappeared, and he remained free of it afterwards. As far as one could make out—he came and told me of it afterwards; I had not treated him at the time—he had cured himself of the fear by bringing up this memory. He could not be certain that the memory was a real memory, but thought that it probably was, because he had lived in India up to the age of two, when he left for England and had not returned since. It was thus probable that it was a real experience; if not so in all its details, the central kernel of the experience was probably real, and its recall was effective in curing him. It will be noticed that he did not ab-react this experience in relation to another person. He was not in a doctor's consulting-room, telling the doctor what he could remember. He was by himself. He had not even gone to a doctor beforehand, so that it could not be described as a transference towards the doctor in the latter's absence. He had not applied to any doctor for treatment at that time. He came on to me afterwards, simply to talk the matter out still further, and to learn whether he had been working on the right lines, and how he should proceed in order to ensure that the fearsome experience should not return. An example like this is a refutation of the view that the only beneficial effect of ab-reaction is the transference. Transference is indeed often the chief factor of cure, and in many ab-reaction cases transference is an additional factor. But an example like this shows that ab-reaction by itself has therapeutic value, in contradiction to Jung's view.[5]

Ab-reaction of repressed emotion sweeps away the repression, and so frees energy which had been previously needed to hold the repressed memories apart from the rest of the mind and away from clear consciousness. This freed energy is thus put once more at the general disposal of the personality. The previous "fixation" of this repressing energy and its deviation from the common fund of energy of the personality probably explains, to some extent, the feeling of fatigue that generally accompanies a psycho-neurosis.

9. PERSONALITY AND SURVIVAL OF BODILY DEATH.

The unitary personality, as an organisation of mental activities and mental powers, is not static but dynamic, and is in process of development throughout life. Although it carries with it, as a physical correlate, a unitary working of the brain and of other parts of the body, this does not necessarily involve complete dependence upon the latter for its continued existence. The question of personal survival of bodily death is one which can be intelligibly and scientifically put, and which is in theory answerable along the lines of scientific observation and inference. The investigations carried out by the Society for Psychical Research during the past 50 years are of this nature, and the Society's results and provisional hypotheses can rightly claim a place in modern psychological science. Nevertheless, if due allowance is made for the possible working of such factors as conscious or sub-conscious fraud, telepathy between the living, and chance coincidence, the scientific evidence for personal survival of bodily death is not very strong.

For more convincing reasons (apart from the pronouncements of revealed religion) in support of this belief we still have to turn to philosophy, and in modern philosophical theories of *value* we find arguments that are far from negligible.[6]

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[3] Hypnotism, Suggestion, and Dissociation, Brit. Med. Jour., June 14th, 1919.

[4] He writes: "It must, above all, be emphasised that it is not merely the rehearsal of experience that possesses an unconditional curative effect, but the rehearsal of experience *in the presence of the physician*." Brit. Jour. Med. Psych., vol. ii., 1921.

[5] I record this case in "Talks on Psychotherapy," University of London Press, Ltd., 1923, pp. 39–41.

[6] I have set out arguments from theory of value in my "Mind and Personality," University of London Press, Ltd., 1926, pp. 309–318.

ST. MARY'S HOSPITAL.—The annual report of St. Mary's Hospital records that the year has been disastrous from the point of view of the ordinary income. The total income was £55,824 and the excess of income over expenditure was £8567. An appeal was launched during the year for £50,000 to provide two operating theatres and 46 additional beds for accidents and sudden emergencies. Towards this extension £32,000 has so far been received. Street accidents treated at the hospital numbered 107 per day.

LUMINAL-SODIUM IN THE TREATMENT OF EPILEPSY.

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THIS paper records the results obtained over a period of five or six years by the administration of luminal-sodium in an epileptic colony. The population of the colony consists of children and young people, and no doubt represents a less hopeful type of the disease than would be met with in ordinary practice. It includes those who by reason of severe or frequent fits, of defective intelligence, or of abnormal behaviour are unfit for ordinary home or school life, though, broadly speaking, it does not include any who should come under the provisions of the Mental Deficiency or Lunacy Acts. In most cases the disease has been under treatment for some years before admission to the colony, so that those who respond readily to bromides have already been eliminated. As a general rule, no drugs are given to a patient on entering the colony. A certain number of patients react favourably and promptly to colony life by an arrest or striking diminution of their fits. This may be due to more suitable diet, fresh air, or a more regular and simple life, but it is more likely the result of the removal from an environment involving emotional strain or from objects or events which were linked, by association, with some unpleasant emotion. Failing such a favourable response, after a few months, mixed bromides are, as a rule, prescribed in doses increasing up to a maximum of 20 or 30 gr. a day, according to the age of the patient. Luminal has generally been given when other therepeutic measures have failed, or when the number of fits has been increasing, or the patient has been obviously going downhill. It will be clear, therefore, that the results set out below have been obtained with rather intractable and unfavourable cases of epilepsy.

The dosage of luminal-sodium has varied from 1–3 gr., given once in the 24 hours, either in the morning or evening. The great majority of the patients have had 2 gr. a day. The size of the dose has not been taken into account in recording the results of treatment. It is pretty clear that larger doses are rather, but not much, more effective than smaller; but, as tolerance so frequently sets in and the omission of the drug may be such a serious matter, doses of 3 gr. or more should not be lightly prescribed. It must be remembered that luminal-sodium is generally said to be rather less effective than luminal itself in the treatment of epilepsy.

Effect of Luminal-sodium on the Incidence of Fits.

In this investigation only those cases were included where the fit figures, observed on the colony, for the six months prior to the luminal administration are available, and where the duration of luminal administration was at least six months. Any alteration of dosage during administration is ignored. In this and subsequent investigations, benefit or decrease of fits means that the monthly average was reduced by one-third or more, harm or increase of fits means that the monthly average was increased by one-third or more. The figures for 167 cases are available, and the results show that 50 (or 30 per cent.) show benefit that is likely to be permanent, 51 (or 31 per cent.) after showing benefit for a period of more than three months apparently became tolerant to the drug, in 56 (or 33 per cent.) the incidence of fits was unaltered or only decreased temporarily for a period of less than three months, while in the remaining 10 cases (or 6 per cent.) there was an increase of fits.

Out of the 50 cases showing benefit, 9 (or 5 per cent. of the whole) have had their fits completely arrested for such long periods—in no case less than two years—that one can anticipate with some confidence that they will not recur.

Successful Cases.

A study of the features of the complaint in those nine cases fails to disclose much that might lead us to define a type particularly likely to respond to this form of treatment. The principal facts about them are as follows:—

CASE 1.—Male. Father had fainting fits as a boy. Two sisters have had fits. Epilepsy began at 18 months. No cause assigned. Type of fits, major attacks at the rate of seven a month, periods of automatism lasting 10 seconds at the rate of five a month. Intelligence quotient estimated about 0·70. Luminal treatment began at the age of 22. Immediate complete cessation of all attacks. Two years later patient left colony and is now, after six years of treatment, still free from any kind of fits and earning his living at poultry farming.

CASE 2.—Male. Mother's father attempted suicide. Epilepsy began at 8 years. No cause assigned. Type of fits, majors one every two or three months, very frequent very slight momentary attacks. Intelligence quotient 1·07. Luminal treatment began at the age of 12. After the first two months total cessation of all attacks, and now, two years later, is still free.

CASE 3.—Male. Mother's father committed suicide. Epilepsy began at 2 years, but there was a five-year period of freedom from fits up to 7 years. No cause assigned. Type of fits, petit mal lasting a few seconds in which he occasionally fell right down. Intelligence quotient 0·90. Luminal treatment began at age of 10. All fits immediately ceased, and now, nearly two years later, have not recurred. All-round mental improvement with luminal.

CASE 4.—Female. Family history nil. Epilepsy began at 6 months. No cause assigned. Type of fits, major attacks more than three a month. Intelligence quotient 0·82. Luminal treatment began at age of 12. Immediate cessation of all fits which, three years later, have not recurred. More irritable during first few months of luminal treatment.

CASE 5.—Male. Mother's uncle epileptic and insane. Epilepsy began at 8 years of age. No cause assigned. Had major attacks at the rate of three in two months. Intelligence quotient 0·90. Luminal treatment started at age of 12. Immediate and complete cessation of all attacks, and patient is now, five years later, still free from fits and earning his living in London.

CASE 6.—Male. Illegitimate. Aunt had epilepsy. Epilepsy began in second year and followed immediately on a fall from a high chair on to his head. Fits very irregularly, mostly of major type, and in the year before luminal was started averaging rather more than two a month. Intelligence quotient 0·79. Luminal started at age of 15, with resultant complete cessation of attacks, but marked increase of patient's irritability. Now, two and a half years later, patient has left the colony and is earning his living at gardening. The fits have not recurred.

CASE 7.—Male. Mother's brother infantile paralysis. Father's sister imbecile. Fits started at 4 years. No cause assigned. Type of fits, majors at rate of 12 a month, similar attacks with loss of consciousness but incomplete convulsions ten a month. Intelligence quotient 0·77. Luminal started at age of 8. Fits stopped at once and patient is still, three years later, free from them. The rapid mental deterioration which was in evidence before the fits stopped was arrested, but there is some reason to think that it is now slowly asserting itself again. Probably the boy will always require institutional care.

CASE 8.—Male. A brother died of convulsions. Epilepsy began at 4 years. No cause assigned. Type of fits, very frequent screaming attacks lasting a few seconds and occasional majors. Intelligence quotient 0·58. Luminal started at age of 21. Some mental imbalance is evidenced by short catatonic attacks during first few weeks of luminal administration. Apart from these, complete cessation of fits has continued for over five years. The patient's mental defect has, however, necessitated his retention in an institution.

CASE 9.—Male. Mother died of fits and tumour on the brain. A brother died of convulsions. Fits began at 13 years of age, said to have followed a fall. Fits of major type, averaging ten a month, and sometimes followed by periods of mental confusion with hallucinations. Intelligence quotient 0·84. Luminal started at age of 20 years. Fits continued for nearly two months and then suddenly stopped, and have remained in abeyance for three years. Former tendencies to bad tempers and antisocial conduct generally have largely disappeared under luminal.

Luminal Medication and the Age of the Patient.

In order to determine whether there is any relation between age and the response to luminal treatment, the 167 patients were divided into five-year groups, according to their ages when the drug was started and the effect on the incidence of fits was noted for each age-group as follows:—

Age in years	5–10.	11–15.	16–20.	21 or over.
Number of cases	16	85	34	32
Permanently benefited	56%	25%	29·5%	31%
Benefited for more than three months	19%	28%	32%	41%
No effect	12·5%	42%	29·5%	25%
Harmed	12·5%	5%	9%	3%

These figures show that the best results are to be expected in early life, and that in later years the drug is likely to have less effect either for good or ill.

Investigations were also carried out to see if the duration of the disease, the age of onset of the disease, or the sex of the patient had any influence in determining the response to luminal, but the results were inconclusive.

Incidence of Fits during Administration of Luminal.

The average number of fits per month was first determined in 157 cases who had had luminal-sodium for six consecutive months.

Months of administration	1st.	2nd.	3rd.	4th.	5th.	6th.
Average number of fits	2·8	3·83	4·55	4·02	4·25	4·8

Then the average number of fits per month in four six-monthly periods was determined in 65 cases in which luminal had been given for at least two years.

Half-yearly periods	1st.	2nd.	3rd.	4th.
Average number of fits	3·47	4·18	4·73	5·33

Finally, the average number of fits per month in eight six-monthly periods was determined in 24 cases in which luminal had been administered for at least four years.

Half-yearly periods	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.
Aver. number of fits	3·25	3·95	3·63	3·9	4·45	4·0	4·13	4·6

The comparatively low average number of fits in the last group of figures is, of course, accounted for by the fact that only cases which have made some improvement with luminal have continued to have it for so long as four years. These figures seem to show beyond any doubt that an acquired tolerance to luminal-sodium is the rule. It must set in pretty rapidly in many cases, but in others, though slow, it is progressive.

These results are in direct contradiction to those obtained by Patterson, Damon, and Levi, of the Craig Colony.[1]

Effect of Stopping Luminal upon the Incidence of Fits.

The administration of luminal has been stopped in a large number of cases because the drug has been useless, or because its period of usefulness has appeared to be over. In two cases the occurrence of rashes has led to the discontinuance of the drug. In a few cases mental alterations, as evidenced by abnormal conduct, have been the cause of luminal being stopped. Periods of abnormal conduct, however, not infrequently occur in epileptics apart altogether from any form of medication, and one should hesitate to ascribe them to any particular drug. Careful scrutiny of these cases in the light of their history, both before and after the period of luminal administration, leads to the belief that probably in only three or four were the mental alterations the outcome of the drug treatment.

The effect of stopping luminal on the incidence of fits is remarkable. In the first month after luminal was stopped, out of 65 cases 72·5 per cent. had more fits than the monthly average during the period of luminal administration, in 20 per cent. the incidence was the same, while in only 7·5 per cent. was it less. In many of the cases where there was a marked increase in the number of fits, luminal treatment was resumed in a few weeks. Even after these cases have been eliminated the incidence of fits in the remaining 45 cases, in which there is a record covering at least six months after the end of luminal treatment, shows an extraordinary rise. The average number of fits per month before luminal was started was 8·1, during luminal treatment was 6·5, and after luminal was stopped was 10·8.

If the cases be taken individually it becomes clear that in about 50 per cent. of the cases the effect of a limited period of luminal administration has been to leave the patient definitely worse off than he was before. It is worth noting that although a considerable increase of fits has followed the cessation of luminal treatment in so many cases, in only one case has the increase been of an order serious enough to endanger life.

CASE 10.—A young man of 19 was a bad case of epilepsy, upon whose fit-incidence luminal-sodium had had but a transient effect. Accordingly, after seven months it was discontinued. A fortnight later the patient had a status epilepticus lasting several hours from which he only just recovered. He had had one attack of status previously.

The Effect of Luminal-sodium on the Mind.

Luminal is a sedative, and it was only to be expected that the immediate effect of giving luminal, even in the small doses used at Lingfield, would be to make the patient a little more sleepy and dull than usual. Such an effect was noted in a small proportion of the cases. It was never very marked, and as a rule it passed off in a few days. In no case was it serious enough to necessitate the cessation of treatment.

Other effects of luminal medication upon the mind and therefore of the conduct of patients, dramatic and far-reaching as they may have been, were, in my opinion, secondary to reduction or arrest of the fits. It is impossible to foretell what will happen if, in a chronic case of epilepsy with frequent attacks, the fits are suddenly arrested; and, as will have been made clear by the foregoing figures, luminal, if it is going to act at all, usually acts quickly. In nine cases out of ten the result is altogether favourable. The patient is brighter, his interest in his environment increases, his bad tempers are fewer and slighter, his asocial conduct tends to disappear. The consciousness of freedom from fits undoubtedly increases his happiness. In a small minority of cases, however, effects of a very different kind may be observed. That these may be varied, in quality and duration, may, perhaps, be best demonstrated by a short account of a few cases.

CASE 11.—A girl of 13 was having major fits at the rate of three in two days, as well as slighter attacks, when she was put on luminal. The major attacks stopped at once and the girl's mental condition, never too stable, rapidly changed for the worse. She refused to get up, but lay in bed, incontinent, noisy, and confused. After five days the luminal was stopped and the patient quickly regained her normal condition.

CASE 12.—The patient, aged 13, was also a troublesome girl who was prone to react to anything that interfered with her wishes by prolonged howling. At the time luminal was started she was having major fits at the rate of 12 a month. The fits stopped at once but the mental instability gradually became more evident, tempers were more frequent, and violence began to appear. Two months later an attack of acute mania necessitated a hypodermic of morphia followed by a few days in bed and some sulphonal. A fortnight after matters came to a climax. The patient became obstructive and abusive. She refused food, broke windows, and retreated under her bed, biting and kicking any who had the temerity to approach her. Sedatives in rather large quantities were called for and the luminal was stopped. The mental condition slowly subsided and the fits returned in a few days' time. In the 18 months that have since elapsed there has been no recurrence of mania or of such marked antisocial conduct, though the patient remains a difficult one to deal with.

CASE 13.—A long-established resident at the colony had been a troublesome school-boy and adolescent, with an

[1] Patterson, H. A., Damon, Le G. A., and Levi, P.: A Comparative Study of Various Methods of the Administration of Luminal in Epilepsy, Jour. Nerv. and Ment. Dis., 1926, lxiii., 446–455.

imperfectly controlled temper. At the age of 23, when he had a pretty regular incidence of four major attacks a month, luminal medication was begun with consequent immediate cessation of all attacks. His conduct gradually became more and more abnormal. Violent tempers followed insignificant provocations. He attacked other patients and finally knocked down a lady member of the staff, and after six months of luminal treatment had to be removed from the colony.

It will be observed that all these cases showed mental instability and asocial tendencies prior to the administration of luminal, and the exaggeration of these was, I believe, not directly due to the luminal itself, but was secondary to the arrest of their fits. It is cases of this type that has, I imagine, led various writers to assert that in arresting his fits by means of drugs we are doing an epileptic a grave disservice. That this was so in these cases is obvious enough, but to apply this dictum to epileptics generally is manifestly absurd. Anyone with much experience of epilepsy must have seen a rapid and progressive deterioration, mental and physical, cut short by an arrest or reduction of the fit-incidence by means of drugs.

Two other cases which present some unusual features may be recorded here.

CASE 14.—A girl, aged 7¼, was subject to major fits at the rate of 23 a month, and was an exceedingly troublesome child. On 1 gr. of luminal-sodium daily the fit-incidence was reduced to eight a month, with a corresponding improvement in behaviour. At the end of three months, however, she became tolerant to the drug. Incontinence, apart from fits, reappeared and she became as noisy, mischievous, and restless as before. At the end of six months the daily dose was increased to 2 gr. The result was dramatic. The attacks stopped at once and her behaviour improved as though by a miracle. This happy state of affairs lasted for exactly a year. Unfortunately, the further sequence of events was not so favourable, but is of interest. Slight attacks without complete loss of consciousness began to manifest themselves and continued to do so irregularly at the rate of about five a month for a further period of two years. During this period her asocial tendencies slowly but surely began to get the upper hand again, and were, I think, accentuated by the early onset of menstruation. Periods of bad temper became more frequent and increasingly violent. She bit, scratched, and attacked those around her and tore her own clothing in shreds, and finally had to be removed from Lingfield on account of the grave detriment her presence caused to others. The major fits never returned. I am not inclined to think that luminal had any prejudical effect on this case; its effect for the first 18 months was clearly most favourable, and it served to delay for two or three years the development of a grave mental instability that was probably inevitable.

CASE 15.—A frail, undersized girl, aged 13, had a very large number of fits, both major and minor. After four and a half years at the colony she had made no progress; rather was it clear that she was pretty rapidly deteriorating mentally and physically. A daily dose of 2 gr. of luminal-sodium was started and in ten days there was a complete cessation of fits of all kinds. Within the same period there was a most extraordinary change in the girl's character. She became very irritable and miserable, at times indulging in copious crying, at other times insolent and making false charges against other girls. Gradually these temperamental changes became less noticeable and the patient became happier and more amenable to ordinary life. At the same time her physical condition improved dramatically. Before luminal was started her average gain in weight had been 5 lb. a year, but she now put on nearly a stone in five months. After four months of luminal administration two isolated major attacks occurred, and four weeks later a series of fits began which culminated within seven days in status epilepticus, hyperpyrexia, and death. There was no previous history of status in this case, and it looks as if luminal in arresting the fits had stored them up, as it were, unilt the breaking-point was reached and they descended like an avalanche with fatal result.

If this is the sequence of events it is a very rare one. Nothing similar is found in any of our case-histories at Lingfield. The nearest approach to it occurred in a girl of 9, who during five months of luminal treatment had monthly attacks of what were, in effect, status epilepticus lasting about an hour and a half, and who, when the luminal was stopped, reverted to four or five isolated majors a month.

Rashes.

Only two cases of rashes due to luminal have been observed. The first occurred in a girl of 15. Ten days after luminal was started a very marked erythema with raised papules appeared on the arms. The appearance was of measles superimposed on scarlatina. There was no rise of temperature. The drug was stopped, and the rash disappeared completely in a few days. A second case occurred in a boy of 12. The rash was exactly similar, but manifested itself within 24 hours of the first dose, and was widespread over the body and limbs. The drug was immediately stopped, but the papules were still visible, chiefly on the forearms, two or three weeks later.

The Effect of Luminal on Different Kinds of Attacks.

Like bromide, luminal is most effective in controlling major fits; automatism and momentary attacks of petit mal are much more resistant to medical treatment, though gratifying results with these do occur. It sometimes happens that with the reduction or arrest of the major attacks the slighter ones become more frequent, the process being reversed if the luminal is stopped. A very interesting case of the familial myoclonus of Unverricht showed this sequence of events most clearly. Luminal was given a good trial for two periods. Each time the major attacks were much fewer and the myoclonic spasms worse; as soon as the luminal was stopped the major attacks reappeared in large number, and the spasms were less. In this case the myoclonus was by far the most serious feature, and the patient was happier without luminal.

The Value of Luminal-sodium given Intermittently.

In one female patient, when the attacks almost always just preceded the menstrual period, luminal was given from the sixteenth day after the start of one period up to the commencement of the next. The result was unsatisfactory. The fits held off during the period of luminal administration, only to appear later, and the total fit-incidence, after three months' trial, was increased. On continuous daily doses a striking reduction in the fits was subsequently obtained. Luminal-sodium in isolated doses up to 5 gr. has been given after the first fit to several patients who usually have a large number of fits in succession. The adoption of this measure has very often been successful in preventing the occurrence of further fits. I have also used the drug hypodermically in doses of from 2–6 gr. in cases of status epilepticus. It is very hard to say how far the course of events in this condition is modified by any treatment. My general impression is that luminal has not been of much avail.

The Value of a Second Period of Administration.

In a few cases where the drug has been discontinued as of no value, a second attempt to control the attacks by luminal-sodium has been made. The fact that the second attempt, with the same dosage, is often more successful than the first seems worth putting on record. It is difficult to see why this should be.

Summary.

This paper records the effect of small doses of luminal-sodium on a series of epileptics whose condition has failed to improve on other methods of treatment.

In the majority of cases benefit was obtained at first, but if the fit-incidence over periods of weeks, months, or years be studied, it is apparent that there was a progressive tolerance, sometimes slow, sometimes rapid, to the drug. In about 1 case in 20 complete and probably permanent arrest of all seizures occurred. These favourable cases showed no features in common which would enable us to define a type of case likely to benefit by the treatment.

Whether the administration of luminal was of value or not, stopping it was almost always followed by an increase of fits, the incidence often being higher than before luminal was started. This is a serious feature of luminal medication.

Grave mental alterations following on the use of luminal occurred but they were rare, and it is submitted that they were the direct result of the abrupt cessation of attacks in chronic epileptics, rather than of luminal itself.

Rashes were only observed in two cases.

The investigations go to show that luminal is a drug that should be used with caution in epilepsy. It should not be prescribed unless there can be careful supervision of the patient's behaviour as well as an accurate fit record. An immediately favourable effect is no criterion of ultimate benefit. It may be justifiable to take some risks to find out whether the patient is one of the few fortunate ones whose fits will be permanently arrested by the drug, but the fact that risks are involved and that harm, not good, may result, should never be out of the physician's mind.

THE INFLUENCE OF ORAL SEPSIS UPON CARBOHYDRATE TOLERANCE IN NON-DIABETICS:

EFFECT OF SUBSEQUENT DENTAL TREATMENT.*

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THE power of focal infections to disturb sugar metabolism has been frequently noted in recent years, though precise observations are still scanty. Long before the general clinical use of blood-sugar estimations it was recognised that a carbuncle might be associated with glycosuria, also that the latter might disappear when the carbuncle healed. It was also noted that dental diseases such as caries and "pyorrhœa" were frequently associated with diabetes. The usual explanation was that the diabetes lowered the patient's resistance, but others thought that chronic sepsis anywhere, including the mouth, might sometimes cause diabetes.

Sir William Willcox [1] writes: "Streptococcal and other toxins may cause a toxic glycosuria, probably by impairment of the endocrine function of the pancreas. Dental sepsis is undoubtedly a factor in the causation of glycosuria in some cases, and it should always be removed in cases of diabetes. A rise in the carbohydrate tolerance has often been observed by me after the removal of dental sepsis in early cases of diabetes." Willcox also states: "It seems probable that diabetes mellitus is caused in some cases by irrecoverable damage to the islets of Langerhans by toxic absorption from dental sepsis."

The study of diabetes has been assisted in recent years by testing the carbohydrate tolerance with the help of blood-sugar curves, following the oral administration of 50 to 100 g. of glucose. This test has also been applied to studying the tendency to glycosuria in those with focal infections or other pathological lesions. Thus, Pemberton,[1] of Philadelphia, used it in many cases of rheumatoid arthritis among American soldiers and found a decreased carbohydrate tolerance in the majority. The degree of failure was proportional to the severity of the cases. He noted that in two cases where the focal infections of tonsillitis and dental abscesses respectively were present, the tolerance was restored to normal on the ablation of the foci. He also shows clearly by means of his blood-sugar curves, that the impaired tolerance continued in the chronic cases after the removal of all demonstrable foci of infection. This suggests that the prolonged action of a toxæmia may bring about a persistent physiological failure of the pancreas; in other words, may lead to the establishment of true diabetes mellitus. Pemberton remarks: "Lowered glucose tolerance rests on fundamental pathological processes. It seems to stand in some relation to inflammatory processes at large, and it appears from the data adduced herewith that the incidence of an inflammatory process in a normal person may induce an impaired tolerance." Gay and Olmsted,[3] using the glucose-tolerance test in many diverse conditions, confirmed Pemberton's results in acute and febrile states of arthritis; Gay also noticed impairment of carbohydrate tolerance in furunculosis, so did Gettler and St. George.[4] Holcomb [5] reports two cases of "diabetes" where carbohydrate tolerance was improved by removal of septic foci. The first was a clear-cut case of diabetes mellitus which was markedly improved by treatment of septic maxillary antra. The second case is more important from our point of view. The patient, when first seen, showed a disturbed blood-sugar curve and had the clinical symptoms of polyuria, &c., pointing to diabetes mellitus. But after extraction of septic teeth with abscesses and the removal of a chronically inflamed appendix, the tolerance, according to the published figures, became entirely normal. This suggests that the disease was not true diabetes, but an example of toxic impairment of carbohydrate tolerance. Sansum (quoted by Holcomb) noted impairment of tolerance in a case of acute tonsillitis. Pringle and Miller [6] studied a large number of arthritics at Bath and confirmed in general Pemberton's findings of a lowered carbohydrate tolerance in this condition. They agree with him that the extent of impairment is parallel to the severity and that the tolerance returns to normal with convalescence—most rapidly when infected foci have been discovered and removed. They particularly mention three cases of impaired tolerance becoming normal after tonsillectomy and one after dental extractions for an apical abscess.

Present Investigation.

No one, so far as we are aware, has systematically studied the effect of oral sepsis and of its subsequent treatment, upon carbohydrate tolerance in non-diabetic patients, as measured by the blood-sugar curve following a standard dose of glucose. It was therefore decided to investigate a series of patients presenting the commoner types of oral sepsis, but without evidence of diabetes.

The patients were newcomers to the clinic of the Liverpool Dental Hospital. They were first examined and selected by Prof. W. Gilmour (the Warden), or his assistant who made the dental diagnosis. They were then examined by D. R. or H. E. as regards their general clinical condition, especially anæmia, dyspepsia, arthritis, or asthenia. The glucose-tolerance test was arranged as soon as possible and carried out in the Thompson Yates Laboratory of Pathology. The patients were asked to take a breakfast consisting of one cup of tea, one round of bread or toast, and one egg or one rasher of bacon and to report for the test two and a half hours later. The blood was taken from the finger with a MacLean pipette; a "fasting" sample was first collected, then 50 g. of glucose in 100 c.cm. of water administered, and further samples collected at half-hourly intervals up to two hours. The blood-sugar was estimated by the Folin-Wu technique.

We were reluctantly compelled to omit systematic urine tests because a number of our patients were women and there were no facilities. But the blood-sugar estimations afforded a very reliable indication of carbohydrate tolerance. The first glucose-tolerance test in each patient served two purposes: (*a*) to give the original state of carbohydrate tolerance, and (*b*) to exclude diabetes mellitus. None of our patients gave a curve which could be construed as diabetic; further, as clinical symptoms of diabetes were completely absent, they have been classified as non-diabetic.

After the test the patients were put under dental treatment and inspected from time to time. When Prof. Gilmour certified great improvement or a cure

* This investigation was carried out on behalf of the Dental Board of the United Kingdom, who assisted by means of a small grant.

the second tolerance test was done. The patients' records were kept on special printed forms. The effect of oral sepsis upon the level and type of the blood-sugar curve was estimated in two different ways:—first by comparing the curve in the same patient before and after dental treatment; second by comparing the curve of the patient before or after dental treatment with a "control average curve" from nine normal persons, also tested with 50 g. of glucose.

In order to simplify the task of comparing the whole test of one patient with that of another, the average number of milligrammes of sugar present in the five separate estimations was calculated—viz., the "combined estimation" (see Table I). This average is, however, only a rough indication of the value of the blood-sugar curve, for it does not show the fasting level, the type of curve, nor the level after the test.

The investigation was begun by D. R., and continued and completed by H. E., who also tested the nine normals. It was hoped to investigate many oral sepsis patients, but they were extraordinarily reluctant to undergo the carbohydrate tolerance test; several refused point blank. After exasperating disappointments, 11 were tested before treatment during about six months. Eight of these were again tested after treatment; five were said to be cured and three greatly improved. The average time between the first and second tests was six months, the longest eight months and the shortest four months. The remaining three patients refused to submit to a second tolerance test, one female alleging that the first test had seriously damaged her health.

With a view to diminishing the number of examinations required, the X ray picture of each patient, originally decided upon, was dispensed with.

TABLE I.—SHOWING THE CARBOHYDRATE TOLERANCE TEST OF 11 CASES OF ORAL SEPSIS BEFORE DENTAL TREATMENT; ALSO OF 8 OF THEM AFTER CURE OR GREAT IMPROVEMENT BY DENTAL TREATMENT.

Case No.	Disease.	Glucose-tolerance test (blood-sugar in mg. per 100 c.cm.)												Clinical result.
		Before treatment of oral sepsis.						After "cure" of oral sepsis.						
		Before glucose.	Hours after glucose.				Combined estimations.	Before glucose.	Hours after glucose.				Combined estimations.	
			½	1	1½	2			½	1	1½	2		
1	Acute alveolar abscess.	100	272	200	150	120	168	99	143	101	91	95	106	Mouth healthy.
2	Acute alveolar abscess and pyorrhœa.	113	200	151	97	88	130	89	150	125	89	80	107	Abscess healed pyorrhœa slight
3	Acute alveolar abscess.	92	186	157	125	107	133	107	166	130	107	96	121	Mouth healthy.
	Average for the 3 acute cases.	102	219	169	124	103	143	98	153	119	96	90	111	—
4	Chronic alveolar abscess.	105	136	114	97	87	108	83	136	120	90	100	106	Mouth healthy.
5	Gingivitis and pharyngitis.	103	125	111	100	94	107	100	166	150	115	103	127	Great improvement; slight gingivitis.
6	Pyorrhœa and gingivitis (5 years).	125	176	166	157	108	146	90	176	120	107	107	120	Marked improve.
7	Pyorrhœa (14 years).	115	176	150	107	100	130	91	147	125	111	95	114	Completely edentulous. Cured.
	Average for 2 pyorrhœa cases with completed tests.	120	176	158	132	104	138	90	161	122	106	101	117	—
8	Pyorrhœa.	132	200	187	162	102	157	Refused test.						—
9	Pyorrhœa and alveolar abscess.	107	157	187	136	103	138	" "						—
	Aver. for Cases 6–9* before treatment.	119	177	172	140	103	142	—	—	—	—	—	—	—
	Aver. for Cases 5–9 before treatment.	116	167	160	132	101	136	—	—	—	—	—	—	—
10	Suppuration and necrosis lower jaw.	120	187	158	111	103	136	103	214	142	111	103	135	Mouth healthy; 2 sequestra removed.
11	Acute gingivitis and suppuration.	120	158	187	150	111	145	Refused test.						—
	Aver. for 8 cases with completed tests.	109	182	151	118	101	132	95	162	127	103	97	117	—
	Aver. for all cases before treatment.	112	179	160	126	102	136	—	—	—	—	—	—	—
	Control tolerance test (av. of 9 normal persons; av. age 32).	93	145	112	97	83	106	93	145	112	97	83	106	—

* Pyorrhœa.

Clinical Histories.

CASE 1.—Female, aged 16. Seen Jan. 28th, 1926. Acute alveolar abscess for three days (right upper first bicuspid). Headache; temperature 103° during tolerance test. Treatment: bicuspid extracted. Re-examined July 4th, 1926. "Mouth healthy."

CASE 2.—Male, aged 41. Seen April 14th, 1926. Large acute alveolar abscess "for few days" (right second lower molar). Several carious teeth. General pyorrhœa. "Some asthenia." Treatment: molar extracted. Ultra-violet rays. Re-examined Sept. 6th, 1926. Abscess healed. Pyorrhœa slight. Patient feels much better.

CASE 3.—Female, aged 11. Seen Jan. 22nd, 1926. Acute alveolar abscess "for few days" (right lower first molar). Extensive caries. A little subacute gingivitis. Abscess burst. Treatment: mouth washes. Right and left first lower molars extracted. Ultra-violet rays. Re-examined Sept. 4th, 1926. "Mouth healthy."

CASE 4.—Male, aged 19. Seen Jan. 21st, 1926. Chronic alveolar abscess three weeks (right upper first bicuspid). History of repeated abscesses. Five carious teeth. Some anæmia and asthenia. Treatment: bicuspid extracted. Carious teeth filled. Re-examined June 23rd, 1926. "Mouth healthy."

CASE 5.—Male, aged 18. Seen June 6th, 1925. Painful bleeding gums, acute membranous gingivitis and pharyngitis (Vincent). Treatment: local and ultra-violet rays. Re-examined Feb. 9th, 1926. General condition much improved. Mouth much improved, slight gingivitis round left upper lateral.

CASE 6.—Female, aged 55. Seen Feb. 16th, 1926. "Pyorrhœa," painful gums five years, much worse last three months. General suppurative gingivitis, specially around upper right molars which were loose. Slight anæmia and loss of weight. Treatment local to gums and ultra-violet rays. Re-examined June 18th, 1926. "Marked improvement. With a little local scaling and filling mouth should be quite healthy."

CASE 7.—Male, aged 64. Seen June 10th, 1925. "Pyorrhœa," painful gums round remaining four teeth in upper jaw; chronic gingivitis, teeth loose. Rheumatic pains in knees. Treatment: all teeth extracted. Re-examined Feb. 2nd, 1926. Gums quite healed. Feels well; gained one stone.

CASE 8.—Male, aged 30. Seen April 7th, 1926. Sore gums for three months. "Typical subacute suppurative gingivitis." Pockets teeth good. Some anæmia. Treatment: local. Refused second tolerance test. There is no record as to the loss or looseness of teeth in this case, but a hospital

patient with "sore gums for three months" and "pockets" would almost certainly have "pyorrhœa"; he has therefore been classified with the other cases of "pyorrhœa." The patient is now at sea.

CASE 9.—Female, aged 21. Seen August 20th, 1925. "Pyorrhœa." Also acute abscess; teeth very carious. Extractions and local treatment to gums. Refused second tolerance test.

CASE 10.—Male, aged 50. Seen July 24th, 1925. Extensive necrosis left lower jaw following extraction of 25 teeth. Slight anæmia and asthenia, rheumatic pains in knees. Treatment: mouth irrigation, removal of sequestra and remaining stumps. Re-examined Feb. 9th, 1926. "General condition improved. Mouth entirely healed."

CASE 11.—Female, aged 30. Seen June 10th, 1925. Suppuration of socket and swelling of jaw following extraction left lower bicuspid 12 days before. Treatment: local. Refused second tolerance test.

Discussion of Results.

MacLean,[7] whose practice we followed in using 50 g. of glucose for the tolerance test, attaches special importance to three points in the blood-sugar curve: (1) the fasting level which should not exceed about 100 mg.; (2) the summit, which should not exceed 160 to 170 mg.; (3) the original, fasting level should

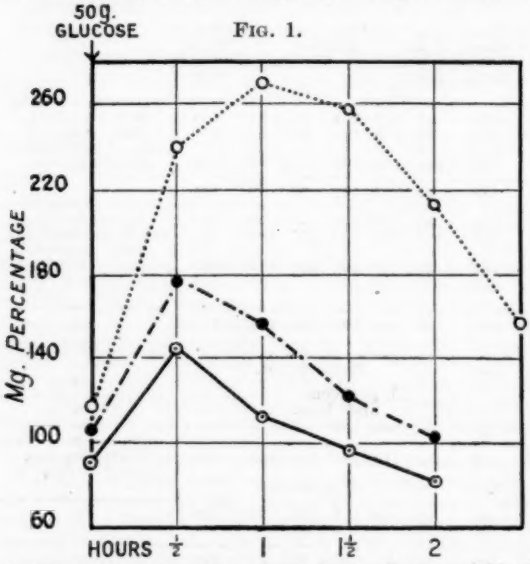

FIG. 1.

Carbohydrate tolerance test. Chart showing "average" blood-sugar curves of nine normal persons (bottom curve), of 11 cases of oral sepsis before treatment (middle curve), and of one case of moderately severe diabetes (top curve).

be reached or nearly reached by the end of the two-hour test. The marked differences in these points between a patient with moderately severe diabetes and a normal are well shown in Fig. 1.

Our 11 patients with oral sepsis have been roughly divided into three groups, though some were difficult to classify: (1) alveolar abscess, four cases, three acute; (2) gingivitis, five cases, one acute (Vincent), and four "pyorrhœa"; (3) post-operative suppuration and necrosis, two cases. The results of all the tests and of the normal control test are shown in Table I. The average figures for the 11 patients, given in the last line but one of the table, when compared with those of the control (last line of the table), show a slight but definite diminution in carbohydrate tolerance (see Fig. 1). The average "combined estimations" also show a diminution, being 136 mg. compared with 106. Figures obtained before treatment in the eight cases in which the tests were afterwards completed are very similar. But the average of their second tests show a definite improvement in tolerance (see table). Further study of the results reveals striking differences between the three groups of patients, these are summarised below.

Group 1.—The three cases of acute alveolar abscess (Cases 1–3) showed a marked diminution in tolerance, the greatest in the three groups. The average of each separate estimation is definitely higher than that of

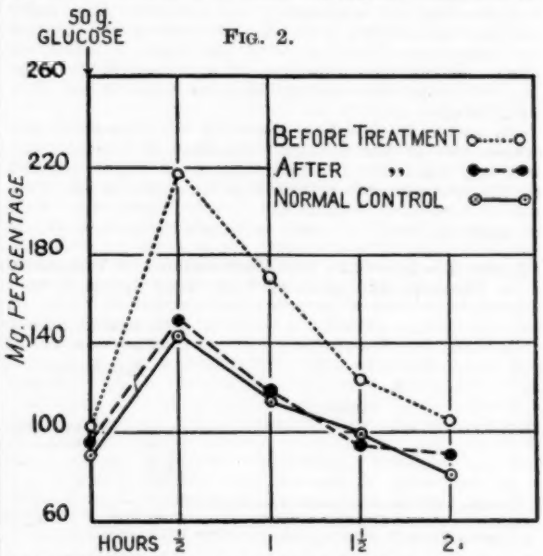

FIG. 2.

Carbohydrate tolerance test. Chart showing average blood-sugar curve of nine normal persons, also of three cases of acute alveolar abscess both before and after dental treatment.

the control by 7 per cent., 74 per cent., 57 per cent., 24 per cent., 20 per cent. respectively and the "combined estimation" by 37 per cent. The curve, however, is unlike that in a moderately severe case of diabetes (Fig. 1) notably in the lower fasting level, the pointed summit and the rapid fall resulting in a return to the original level at the end of the test. In Case 1, that of a female whose temperature was 103° during the test, the high level of the curve indicates that glycosuria must have been present about the end of the first half hour, the normal renal threshold for glucose being about 180 mg. per cent. After treatment, which cured the abscess in all and greatly benefited the pyorrhœa in Case 2, the

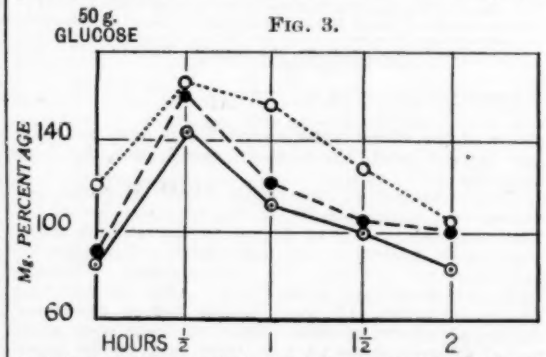

FIG. 3.

Carbohydrate tolerance test. Chart showing average blood-sugar curve of nine normal persons, also in two cases of pyorrhœa both before and after treatment.

tolerance improved so much that the averages became practically identical with those of the control (see Fig. 2). In Case 4 of chronic alveolar abscess there was no diminution in tolerance and no difference before and after treatment.

Group 2.—The four cases of pyorrhœa (Cases 6–9) all showed a diminished tolerance, but the averages produced a different type of curve from those in Group 1. The fasting level was higher than the control's—viz., by 26 per cent., and the fall was

delayed so that the summit of the curve became somewhat flattened and began to approximate to the diabetic type (see Fig. 1). In Cases 6 and 7, tested twice, the curve before the treatment was similar. After treatment, however, the tolerance improved and was only slightly less than the control's (Fig. 3). The failure to improve quite as much as in the alveolar abscess after treatment is, perhaps, partly due to age, for in later years sugar tolerance tends to diminish. Thus the cases of pyorrhœa averaged 59 years and of alveolar abscess only 22 years.

The differences in tolerance which have emerged in patients of these two groups would have been greater had the tests been made with 100 g. of glucose instead of 50 g. In Case 5 of acute membranous gingivitis and pharyngitis (Vincent) the tolerance was apparently less after cure than before, the combined estimations being respectively 107 and 127. This may be due to some difference in the patient's diet before the sugar test or to the failure to take the prescribed breakfast. Both, however, are normal curves.

Group 3 comprises two cases of post-operative suppuration and necrosis. The tolerance in Case 10 (a man of 50) was practically the same before and after treatment, while that of the other patient, which was distinctly diminished, was not tested again.

Summary and Conclusions.

1. Evidence has been produced from a study of 11 cases that oral sepsis in non-diabetic patients is usually associated with slight but definite diminution in carbohydrate tolerance. 2. This diminution was greater in the three cases of acute alveolar abscess than in the four of pyorrhœa. 3. Subsequent dental treatment of five of these seven cases, which cured or greatly improved the oral disease, was associated with an increase in tolerance, so that it practically equalled the tolerance of the normal control. This improvement from treatment is evidence that the oral sepsis *caused* the diminution in carbohydrate tolerance. Such a depression might, if prolonged, perhaps lead to glycosuria or even to diabetes.

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MULTIPLE CAVERNOUS ANGIOMATA OF THE SWEAT DUCTS

ASSOCIATED WITH HEMIPLEGIA.

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THE case which is about to be described would seem to be one of congenital multiple cavernous angiomata of the sweat ducts, associated with, but not due to, syphilis in a man 30 years of age, with a history of two hemiplegic attacks and symptoms of cerebral softening and hypothyroidism. The condition is sufficiently unusual to make a full account of interest.

The patient, male, aged 30, is the fifth child of a family of 11. The mother and father are both alive and well, and their Wassermann reactions are negative. Three of the children have died, the first two of meningitis at the age of 12 months and the youngest of tuberculous peritonitis. One brother shows the same skin condition as the patient.

The patient was a weak child, but states that the only illness he has had up to the age of 21 years was measles. He has never felt well, however, and has suffered from frequent attacks of bilateral frontal headache. He was rejected from the army in 1915. In 1918 he felt so run-down that he gave up work, and later in the same year he developed a right hemiplegia. He was then 21. The attack came on during the day, was sudden in onset, and preceded by no illness. Speech was not affected, and complete recovery took place in two years. In 1922, at the age of 25, he had a similar attack, but in addition there was involvement of the left side of the face and loss of speech. There was no loss of consciousness in either attack.

Since the last stroke, from which he has completely recovered, he has suffered from general debility and nervousness, and complains of generalised pains in the back and all four limbs, which he states have been continuous for the last eight years.

Condition on Examination.

The patient gives a general impression of mental dullness. Speech and articulation are normal. He is slow in all his movements, and complains of always feeling cold.

The optic discs show a varicose and degenerated condition of the retinal vessels but no hæmorrhages. The visual fields are full. The pupils are equal, circular and central, and react to light and convergence. The other cranial nerves are normal. There is no disorder of sensation or coördination. The upper and lower teeth can only be separated for about one inch. The jaw-jerk is present and the other reflexes are normal. The heart and other viscera are healthy. The temperature is usually about 98° F., and the average pulse-rate is 90. The blood pressure is 115 mm. Hg systolic and 90 mm. diastolic.

The *skin* shows multiple small pinhead disseminated angiomata distributed over the lower thorax, abdomen, lateral aspects of trunk, buttocks, thighs, and genitals. The arms and upper thorax are free. The mucous membrane of the lips, cheeks, and soft palate are also involved, but not the tongue. The spots are somewhat purplish in colour, and in some cases coalesce to form larger plaques. They are present in enormous numbers as if the skin had been peppered—a few appear purpuric owing to rupture either spontaneously or through slight traumatism, but none are of the well-known spider nævus type, which bleed externally when injured. There is a small nævus on the right upper eyelid and a yellowish-brown mole over the right clavicle. The condition is a congenital angiomatous one and not purpuric, the vascular spaces being apparently situated round the sweat pores.

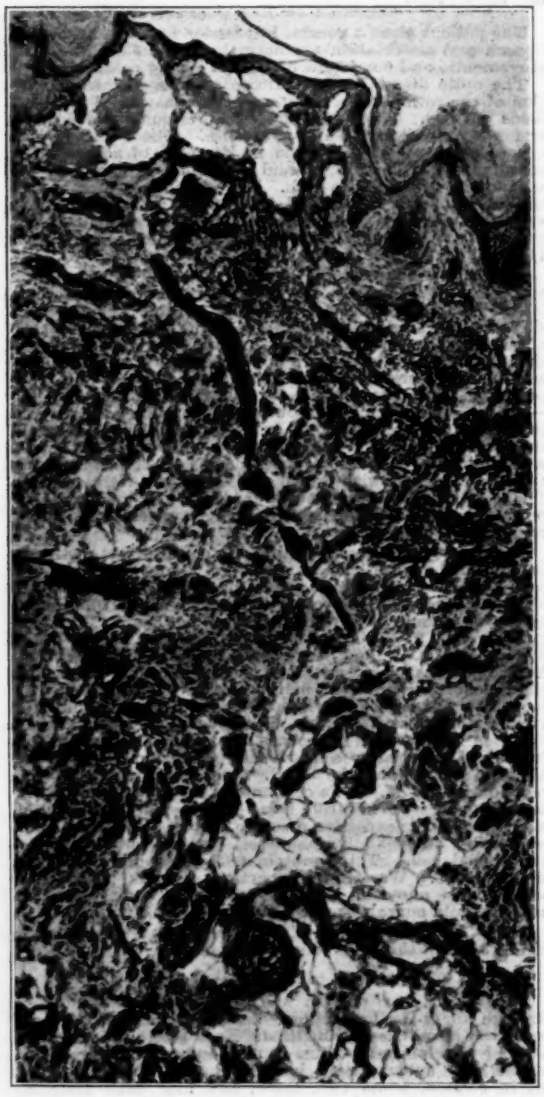
The blood flowed readily from the ear and was distinctly pale and watery. The blood count shows 5,390,000 red cells and 9400 white cells per c.mm. The hæmoglobin is 59 per cent. and the colour-index is 0·55. Differential leucocyte count: polymorphs, 72·5 per cent.; lymphocytes, small, 21·5 per cent.; large, 4·5 per cent.; total, 26·0 per cent.; and large mononuclears 3·5 per cent. Eosinophils 1·0 per cent., but no mast cells. The films show general diminution in the size of the red cells with moderate anisocytosis. The blood on first examination yielded a negative W.R., but there was about half an hour's delay in the rate of hæmolysis. On second examination, taken 24 hours after a provocative intravenous injection of novarsenobillon, the W.R. showed a weak positive reaction with 4 M.H.D.'s of complement and quite definite as compared with negative sera. The cerebro-spinal fluid, which was under excessive pressure, shows 4 cells per c.mm., practically all small lymphocytes, with a very occasional endothelial cell. Total protein 0·04 per cent. Globulin, slight excess. Wassermann reaction, a weak positive reaction with about 4 M.H.D.'s of complement. Lange's colloidal gold curve was of the luetic type, 1233321000.

The X ray photographs of the skull show slight thinning of the bone in the right temporal region.

Histological Examination.

An excised piece of skin was fixed in formalin and put through for paraffin section—stained with hæmatin and eosin and by v. Gieson's method. Each section of the area, about ½ inch long, shows one or two, and occasionally three, of the little subcutaneous vascular patches. They consist of, in section, some two, three, and four little irregular "cavernous" spaces, very much like those seen in a cavernous angioma of the liver, with connective tissue septa and walls, and a rather indefinite layer of lining cells, probably flattened endothelial cells, which are at some places fairly distinct with nuclei projecting slightly into the lumen, like ordinary vascular endothelium—but at other parts they are somewhat indefinite and at others apparently wanting—the wall at these places being formed distinctly by connective tissue. The tissue was extremely tough and difficult to cut, and it is a little difficult to decide whether some of the lining has been lost during the cutting and staining. The little "cavernous angiomata" appear to be situated at or near the openings of the sweat ducts. They are mostly situated just under the epithelium which is distinctly thinned over them, but in the connective tissue of the corium there is considerable hyperkeratosis of the adjacent epithelium, and also increased density of the connective

tissues of the surrounding cutis vera. The acini of many of the sweat glands are very irregular in size, some appear fairly normal, but, in the same group, other acini are dilated to a varying degree, from slightly—and with cubical to almost columnar epithelium, occasionally more than one layer deep—to more dilated spaces, almost small "cysts," lined with much more flattened epithelium, in some instances almost atrophied to the disappearing point. In one gland there was one small vascular space immediately adjacent to the acini, which very closely resembled the more superficial cavernous spaces, but this was exceptional, and this particular gland may be of some interest in the ætiology of



Section showing vascular space in relation to the opening of a sweat duct, epithelial keratosis, and a small cavernous vascular space resembling the more superficial ones adjacent to the acini of a sweat gland.

the condition. There appears to be no analogous condition of the sebaceous glands or of the hair follicles.

In most of the cavernous spaces there was a distinct excess of polymorphs, and the blood in some of the spaces was thrombosed. There were no surrounding "nævoid" cells, but a few polymorphs were also found in the surrounding connective tissue, indicating some slight inflammatory reaction. There was some extravasated recent blood amongst the loose cells of the stratum corneum, but this is probably "operative" in origin.

Conclusion.

The varicose and degenerated condition of the retinal vessels leads one to consider the possibility of similar involvement of those of the cortex as is frequently found in adenoma sebaceum. This might explain the dementia and the unusual age at which the hemiplegic attacks occurred—the result of hæmorrhages or thromboses. It is of interest while considering the patient's mental condition to call to mind that mental depression, which was a marked feature in this case, is a frequent symptom of affections of the sweat gland apparatus—i.e., lichen planus. From the endocrine standpoint the dryness of the skin, the pains in the limbs, situated near but not in the joints, the dull mental depression, the slowness of movement, and the constant chilliness seem to point to a diminished thyroxin secretion. The mother's W.R. being negative, as is that of the brother showing the same skin condition as the patient, would seem to indicate that the vascular lesions are not related to syphilis.

I am indebted to Dr. W. E. Carnegie Dickson, pathologist to the West End Hospital, for the microphotograph and his kind help in the laboratory investigations, and Dr. Hildred Carlill for permission to publish the case.

AN INVESTIGATION INTO THE RESULT OF X RAY TREATMENT OF PRIMARY MALIGNANT INTRATHORACIC TUMOURS.

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THIS investigation was suggested by a case in which there appeared to have been a temporary disappearance of a sarcoma of the lung under X ray treatment. The details are as follows.

In June, 1914, a boy, A. A., aged 12, was admitted to the London Hospital. He was well until January, 1914, when he began to lose weight and to have night sweats. In April the mother noticed lumps appearing on the right side of the chest. On admission the child was wasted, the apex beat was in the left midaxillary line, there was dullness over the right side up to the second rib, and a network of greatly enlarged veins over the right chest and abdomen. Over the fifth and sixth ribs on the right side, just outside the nipple line, were two lumps the size of walnuts. A diagnosis of sarcoma was made. Under X ray treatment by Dr. Gilbert Scott the lumps and the enlarged veins disappeared completely, the heart returned to its normal position, and the chest became relatively resonant. He was discharged to a convalescent home in August greatly improved, and in September appeared to be well with no symptoms. In June, 1915, to our intense disappointment he returned to the hospital again, desperately ill, and died. At the post-mortem examination mediastinal sarcoma was found invading the lung, mediastinum, and pericardium.

Since then, though we had known of temporary disappearance, no example of recovery from a malignant intrathoracic tumour had come under our notice. We therefore decided to investigate a number of cases in order to determine whether X ray treatment was ever curative, whether it prolonged life, or caused amelioration of symptoms.

Material.

Our material consists of 120 cases from St. Bartholomew's, Charing Cross, and the London Hospitals, and private cases. The hospital cases were under the care of the following physicians: Dr. James Calvert, Dr. Chandler, Lord Dawson, Dr. Morley Fletcher, Dr. David Forsyth, Prof. F. R.

Fraser, Dr. A. E. Gow, Dr. George Graham, Dr. Wilfrid Hadley, Sir Percival Hartley, Sir Thomas Horder, Dr. Robert Hutchison, Dr. R. A. Rowlands, Dr. Lewis Smith, Dr. Theodore Thompson, Dr. Cecil Wall. The treatment was supervised by Dr. A. C. D. Finzi, Dr. Russell Reynolds, Dr. Gilbert Scott, and Dr. Robert Knox.

FIG. 1.

K. L., August 16th, 1923.

Diagnosis.

The diagnosis rests on symptoms, physical signs, radiography, histological examination of secondary deposits, and post-mortem examinations. We have not attempted to differentiate between primary carcinoma of the lung and primary sarcoma of the mediastinum, partly because of the difficulty of their clinical differentiation and partly because, even

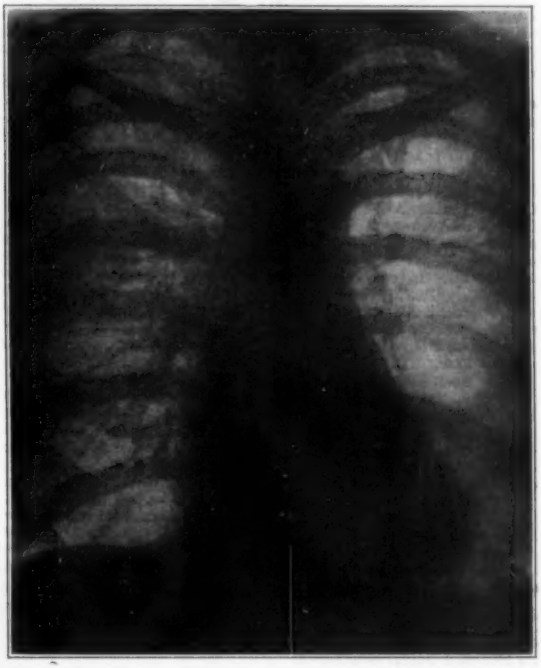
FIG. 2.

K. L., April 10th, 1924.

histologically, no hard-and-fast differentiation would be accepted by all pathologists.

Of the 120 cases investigated, 59 have been treated with X rays, and followed up, either to a fatal termination, or, as with those still alive, to the present date. Of the 59 treated cases, 55 have died, a percentage of 93·2. Four cases in the series lived, and these will be reviewed later. The 61 cases which had no X ray treatment all terminated fatally. The average duration of the disease from the first symptom complained of until death was six months for those cases untreated and 11 months for those treated with X rays. The apparent shorter period for those cases untreated is probably fallacious, as many of the cases came to hospital in the last stages of the disease, some only three weeks before death. Moreover, some of the treated cases were of a more chronic type, where symptoms had existed 18 months before treatment was begun. We have no evidence that the treatment caused amelioration of symptoms, except in those cases where the tumour has disappeared temporarily or permanently. In fact, in many cases the symptoms after treatment were aggra-

FIG. 3.



K. L., May 5th, 1925.

vated, malaise or dyspnœa increased, or distressing vomiting was produced.

Review of the Four Cases of Apparent Recovery.

One, George W., aged 31, from the history, course, and X ray appearance would appear to have been a case of fibrosis and probably bronchiectasis of the right upper lobe.

The second, Eliza S., aged 60, was a right upper lobe case with a doubtful diagnosis.

The third, Ernest M., aged 50, was a case with shadowing in the neighbourhood of both lung roots with no certain evidence of malignancy either clinical or radiological.

The fourth case comes into a totally different category and will be described in some detail. All the evidence, clinical, radiological, and histological, pointed almost unequivocally to malignant disease.

Clinical Record.

K. L., aged 25, female, clerk. Admitted to St. Bartholomew's Hospital on August 11th, 1923, under Sir Thomas Horder and Dr. Gow, complaining of shortness of breath.

History of Present Condition.—Five months sore throat, tired easily, three days later cough, weakness. "Influenza," bed one week. No improvement. Four months pleural effusion (right). Aspirated four times at intervals of three

to two weeks. Six weeks cough with sputum. Three weeks orthopnœa and swelling of left arm. No hæmoptysis. No pain in chest.

Condition on Admission.—Orthopnœic, sallow, face puffy. Temp. 98° F., pulse 130, resp. 40. Pupils equal. Veins at root of neck enlarged, both left and right. Enlarged glands at root of neck, both left and right. No unilateral sweating. No oral sepsis. No pericarditis. Swelling left breast and left arm and prominence to left of manubrium. Signs of bilateral pleural effusion—greater on right. Patch of friction sixth to eighth rib behind on left. Slight œdema of legs. Urine: Nothing abnormal found. Paracentesis thoracis right and left. Two pints removed from each side. Blood count: Dilated veins on left side of abdomen. Other systems: Nil. The radiographic appearance on August 16th is shown in Fig. 1.

Pathological Reports.

August 13th: Red blood cells, 4,180,000; white blood cells, 14,400; Hb., 66 per cent.; colour-index, 0·8.

Pleural Effusion.—4 c.cm. yellowish-green fluid. Large gelatinous clot. No obvious blood. Albumin 0·55 per cent. (Aufrecht). Centrifuged deposit: Lymphocytes 80 per cent.; endothelial cells, 5 per cent.; red blood corpuscles, 15 per cent. No malignant cells seen. Culture: (1) *M. catarrhalis*, (2) staphylococcus.

28th: Section of gland from right supraclavicular fossa; appearances those of endothelial sarcoma such as found in new growths of mediastinum (Sir B. Spilsbury).

Treatment.

X ray treatment under the supervision of Dr. Finzi began on August 24th, 1923. Dose, 4 H. Filter, 0·5 mm. Cu., + 1 mm. Al. 170 K. V. peak discontinous current at 54 cm. and repeated each day for about 12 days (different areas each day). Oct. 5th: Getting worse. Slight bout of fever (Sept. 1st) to 101° irregular for nine days. Neokharsivan. Intravenous 0·3, 0·45, 0·6, and 0·9 g. at intervals of six days. 22nd: X rays repeated. 3 H. Filter, 5 mm. Cu. + 1 mm. Al. at 54 cm. at different areas each day for six days. Nov. 16th: Collosal selenium, three doses of 1 c.cm. and three doses of 3 c.cm. intravenous on alternate days. Dec. 4th: Discharged in statu quo.

Jan. 2nd, 1924: Readmitted for X ray treatment.

Radiologist's Report.—The tumour in the mediastinum has disappeared. Still fluid at both bases. More on right level fourth rib ant. (Dudley Stone). 8th: *X ray treatment.*—4 H. Filter, 0·5 mm. Cu. + 1 mm. Al. 170 K. V. peak discontinuous current at 40 cm. to glands in left side neck, each day for five days (different areas). Went home and was well for ten days, then *neck painful* on movement. Gained in weight. Could walk five miles. March 11th: Pleural friction at angle of left scapula. Percussion dull below this. Friction right base. Fremitus present left base—absent right. 12th: *Radiogram.*—Still fluid on right side but clearer than before. Opacity at left base increased.

Clinical Report.—Lungs same. Abdomen: Dilated veins left side. Liver: Dullness three fingers-breadth below costal margin. Spleen not palpable. Something (?) felt to left and below umbilicus.

April 10th: Radiogram (Fig. 2).

11th: *Blood.*—Red blood cells, 4,050,000; white blood cells, 12,400; Hb., 75 per cent.; C.I., 0·93. Dec. 12th: Radiogram as before. May 5th, 1925: Radiogram. Base both lungs clearer than when last skiagram taken. I should now pass this skiagram as practically normal with the exception of a few dilated bronchi on both sides (Finzi) (Fig. 3).

At the date of writing, March, 1927, Dr. R. Harvey-Williams reports the patient as in perfectly good health and the skiagram is normal.

Discussion.

It may be said that the diagnosis of this case was wrong, and that the histologist was mistaken in his interpretation of the gland section. What are the possible alternatives? Lymphadenoma is the first that suggests itself. It would explain every sign and symptom and the radiographic appearances. The section of the gland did not support this diagnosis; but histologists, like clinicians, are not immune from error. If it were lymphadenoma, the result, in its permanence, is almost as remarkable as if it were sarcoma. Tuberculosis, we think, can be excluded positively. There was no evidence of this, and we doubt if a tuberculous lymphadenitis of the mediastinum has ever produced the huge masses seen in this case. Hydatid or dermoid cyst would not disappear in this manner. A simple inflammatory tumour or tumours is not infrequently the explanation given after the disappearance of an apparent malignant tumour, with or without treatment. In many parts of the body such an interpretation cannot be gainsaid. But what inflammatory mass can be conceived in this situation, giving rise to recurrent bilateral pleural effusion with glands in the neck? Syphilis can scarcely demand serious consideration. There is no record of a W.R., but even if the masses were regarded as syphilitic—which in our opinion would be almost incredible—the whole clinical picture is unlike anything we have seen, heard, or read of in cases of syphilis of the lung or mediastinum.

Conclusions.

1. *Cure.*—One case out of 59 treated by X rays appears to have been cured. All the untreated cases investigated died.

2. *Prolongation of Life.*—Except in the case cured there is no evidence that life was prolonged by treatment.

3. *Amelioration of Symptoms.*—Except in a few cases symptoms do not appear to have been relieved by X ray treatment. Yet it cannot be denied that the psychological effect is great. Whether it should be employed purely as a placebo may be a matter of opinion. Many pathetic letters received in answer to our inquiries showed that a number of the patients died in great suffering, and we feel that there is too great a reluctance on the part of the profession to employ adequate doses of anodyne in painful mortal disease.

4. That one case of apparently definite malignant disease was cured must stimulate further research in this method of treatment. Whether the other remedies combined with the X rays, such as salvarsan and selenium, had an influence is a matter deserving further investigation.

We would express our special indebtedness to Sir Thomas Horder, Dr. Gow, and Dr. Finzi.

Clinical and Laboratory Notes.

THREE CASES OF RUPTURE OF THE UTERUS AT THE SITE OF A PREVIOUS CÆSAREAN SECTION.

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IN the first of these three cases there were definite signs of the onset of labour—viz., dilatation of the external os and the presence of a "show"—though uterine contractions could not be felt. In the second case there was no evidence of the onset of labour, while in the third definite contractions of the uterus were felt together with slight dilatation of the cervix, and a show. The clinical history of the cases was as follows.

CASE 1.—A 3-gravida, aged 27. The first pregnancy had ended in the normal delivery of a living child 5 lb. 4 oz. in weight. The second labour was complicated by a central placenta prævia, and the patient was delivered by Cæsarean section on Nov. 26th, 1923. The puerperium was uneventful.

Pregnant for the third time, the patient was admitted at 6.50 A.M. on July 21st, 1925, and stated that she had come into labour at 5.30 A.M. She was seen by the house surgeon, who did not notice anything abnormal. I saw her at 10 A.M., and she complained of abdominal pain. The abdomen was somewhat distended and distinctly tender. The head of the fœtus could be felt presenting, and was apparently of normal size. On vaginal examination the os was dilated to the size of one finger, and there was a show. As bimanual examination was unsatisfactory, an anæsthetic was administered, and it was then decided that the head would pass the brim successfully. It was noted that one limb of the fœtus lying in front was very plainly palpable, and could be freely

moved about. The presence of the fœtal heart was not definite.

I saw her again at 2.40 P.M., and as the labour had not progressed at all, I decided to remove the fœtus by Cæsarean section. On opening the abdomen, a large quantity of blood was found free in the peritoneal cavity, together with the fœtus and placenta. The uterus was found firmly retracted below and to the left of the fœtus, with a rupture in its anterior wall, throughout the length of the previous incision. I removed the dead fœtus, 8 lb. in weight, and secundines, and as the wall of the uterus appeared thick and healthy I resutured the wound in the wall. At the end of the operation the pulse was good and its rate 122. Convalescence was uneventful.

The interesting point in this case is as to when the uterus had ruptured. If it had ruptured at the onset of labour it is difficult to account for the labour pains. There was no suggestion in the patient's condition of a large hæmorrhage, the only incomprehensible sign being the tenderness and slight distension of the abdomen which suggested a peritoneal crisis.

On Feb. 9th, 1927, this patient reported at the clinic, again pregnant, but uncertain of the period of amenorrhœa. On examination I estimated the duration of pregnancy to be about 26 weeks, and from that date until her admission to hospital on May 5th she was kept under observation. On the 16th, at 5 P.M., she began to have labour pains, and at 6 P.M., by the courtesy of Mr. Leyland Robinson, I did a Cæsarean section. On opening the abdomen there were surprisingly few adhesions, the great omentum being lightly adherent to the fundus of the bladder and low down on the abdominal wall. The previous scar was imperceptible before the uterus was emptied, and had retracted. The placenta was situated on the posterior uterine wall, and the child, a healthy female, weighed 6½ lb.

CASE 2.—A 5-gravida, aged 35. Her first three children had each been delivered by craniotomy. The fourth child had been delivered by Cæsarean section two years previously. During this pregnancy the patient had been under observation at an antenatal clinic, and arrangements had been made for delivery by Cæsarean section about Dec. 23rd, 1925, though the date of expected delivery was Jan. 6th, 1926. On Dec. 12th she complained of abdominal pain and went to bed. At 7 P.M. on Dec. 14th she had severe abdominal pain and vomited. At 9.30 P.M. she was admitted to hospital complaining of severe pain all over the abdomen and between the shoulders.

The house surgeon saw her, and noted that she was very collapsed, that there were no signs of the onset of labour, and that the fœtus was easily palpable. The temperature was 97·6° F., the pulse-rate 96, and the respiration-rate 24. The collapse was treated by hypodermic injections of ether ℿx., digitalone gr. 1/10, and saline solution 1 pint intravenously. The provisional diagnosis was perforation of the gut.

I was asked to see her on the next day when she had recovered from the collapse. I was struck by her pallor, and the pulse was weak and frequent. The abdomen was somewhat distended, tender, and no fœtal parts were palpable. I was of the opinion that the uterus had ruptured and recommended laparotomy. On opening the abdomen a large quantity of fluid and clotted blood was found free in its cavity. The uterus had ruptured throughout the length of the scar of the previous Cæsarean section; it had expelled the fœtus and placenta and was firmly retracted. The amniotic cavity was unruptured, the fœtus being still enclosed in the sac of membranes and placenta. At one spot the membranes were still attached to the interior of the uterus.

In this instance I did a subtotal hysterectomy after removing the dead fœtus and secundines. At the end of the operation the pulse-rate was 120 and the temperature 97·6° F. One pint of saline was given subcutaneously. On the next day 50 c.cm. of antistreptococcal serum was administered intravenously as a prophylactic, and after that the convalescence proceeded normally, the patient being discharged from hospital on Jan. 11th, 1926.

Microscopical examination of the uterine wall at the site of the wound did not reveal any excessive fibrotic change. It showed the presence of a moderate number of polymorphonuclear leucocytes among the muscle-fibres, as well as some chorionic villi. The existence of the latter suggests that the placenta had been situated on the anterior wall of the uterus.

CASE 3.—A 2-gravida, aged 20. The first pregnancy had been terminated prematurely by Cæsarean section on Nov. 18th, 1925, for toxic albuminuria. The patient was desperately ill on admission to hospital, and after reacting slightly to treatment had relapsed; it was believed that she would not stand the strain of parturition. After delivery she had pyrexia up to 100·4°F. on the second and third days, but after that convalescence was normal and uninterrupted. With the second pregnancy she came under observation on Dec. 15th, 1926, with an indefinite history of the last menstrual period having occurred in April, 1926. I estimated the duration of the pregnancy to be about 35 weeks. She had had no trouble, there was no albuminuria, the measurements were normal, and I decided to allow her to attempt delivery normally. She remained in hospital until Jan. 16th, 1927, when she insisted on going out for a day or two. She returned at 5.45 A.M. on Jan. 17th, and stated that she had had severe pain since 5.30 A.M., sudden in onset and situated in the abdomen. The temperature was 97·4°F., the pulse 116 and weak, being at times imperceptible. She was seen by the house surgeon, who noted that contractions of the uterus were perceptible, and that the external os was dilated to the size of one finger. He did not think that the uterus had ruptured at that time, and he gave her morphine gr. 1/4 and digitalin gr. 1/100.

I saw her at 9.45 A.M., when the pulse-rate was 118, the skin was pale, cold, and moist, and the respirations were sighing in character. The abdomen was tender, but fœtal parts could be felt apparently normally, and *the fœtal heart sounds could also be heard.* Laparotomy was performed at 10.15 A.M. There was a large quantity of blood in the peritoneal cavity partially clotted. The great omentum was seen to be lightly adherent to the front of the uterus, round the gaping wound of the rupture, which had taken place through the lower four-fifths of the scar of the previous Cæsarean section. The placenta was seen to be situated on the anterior wall of the uterus over the site of the rupture, consequently it had not completely separated, the amniotic sac was unruptured, and the fœtus was still in utero. I rapidly removed the fœtus, but found it to be dead. Owing to the patient's youth and her desperate condition, I determined to suture the wound in the uterus, and in doing so found that the wall was very thin in its upper part. While hurriedly performing the peritoneal toilette, I collected about 150 c.cm. of blood, and after closing the abdomen by through-and-through silkworm-gut sutures, I transfused her with her own blood, filtered through gauze, followed by 100 c.cm. of normal saline.

On the next day the temperature rose to 100° F., and there was some trouble with the chest. On the three succeeding days the temperature rose to 99° F., and thereafter fell to, and remained at, normal. Convalescence proceeded interruptedly. The "chestiness" cleared up in three or four days.

The points of interest in this case are: (1) The uterus ruptured without expelling the fœtus into the uterine cavity. This, I believe, was due to the fact that the placenta was on the anterior wall and helped to limit the separation of the edges of the rent. (2) The fœtus lived for some hours after rupture took place. (3) In transfusing into a vein, I certainly introduced small clots, and the products of thrombosis of the blood, into her circulation, and I almost expected to produce a generalised thrombosis. At no time, however, was there even a suggestion of pulmonary infarction, though particular attention was paid to the examination of the chest. In this case I propose to excise the thin scar in the uterus before the next pregnancy.

Conclusion.

It is difficult to account for the rupture in these cases. The previous Cæsarean sections had all been done by an experienced surgeon. In no case was there any suggestion of sepsis after the section, not even in the first, which was done as an emergency. In all three of them rupture occurred right at the commencement of labour, there being no question of the scar having to withstand the strain of the expulsive stage; indeed, in the second case there was no clinical evidence of the onset of labour. From this fact one infers that, in cases which are being allowed to go into natural labour after having had a previous Cæsarean section, if the labour starts without rupture of the uterus it can be expected to terminate without risk of rupture. These cases apparently support the dictum, "Once a Cæsarean, always a Cæsarean," to which, however, I do not subscribe, as I see every year a number of cases, delivered per vias naturales, which have previously had Cæsarean sections for conditions which are not present in the

labours in question. The first two cases illustrate the well-known fact that the parturient woman can stand an enormous loss of blood, and also that the uterus tends to empty itself when ruptured, and having done so, retracts efficiently and prevents a further loss of blood both from the placental area and the site of the rupture. In the third case the situation of the placenta on the anterior wall acted mechanically in limiting the separation of the edges of the wound and expulsion of the fœtus and its appendages.

The situation of the placenta on the anterior wall of the uterus under the site of the old scar may predispose to its weakening and rupture. In the second and third cases there was definite evidence of the placental site being in front, and in the first case, in the recent Cæsarean section, when the scar of the previous rupture was found to be sound, the placenta was situated behind.

A CASE OF
PRIMARY ACTINOMYCOSIS OF LUNGS
WITH SECONDARY PERITONITIS.

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THE diagnostic difficulties in the following case make it of interest.

The patient, an unmarried girl aged 19 years, was employed as a lamp-shade maker. She had been treated for anæmia four years previously, but had otherwise been fairly strong. There was no history of any chest trouble. Having felt out of sorts for a week, she vomited on Nov. 19th, 1926. The vomiting was followed by pain in the left shoulder, hiccough, and slight hypogastric pain with smarting on micturition. Vomiting and constipation continued until Nov. 23rd, after which the bowels were open daily. On the following day she had a slight rigor. There was no cough or headache at any time.

She was admitted to hospital on Nov. 26th with fever, considerable hypogastric distension, an indefinite lump in the cæcal region, having some overlying rigidity and tenderness, and a similar lump in the left iliac fossa. There was a rough pleural rub and signs of consolidation over the left lower lobe. Per rectum the uterus was found to be normal in size, retroverted and fixed. The number of white cells in the blood was 52,000 per c.mm.; the urine was clear and a blood culture was sterile. While she was under observation her temperature ranged between 100°–103° F., her respiration-rate was about 30, and her pulse slowish. On Dec. 1st a pleural rub appeared at the right base, and a small quantity of slightly turbid fluid was aspirated from the left chest. This fluid remained sterile after prolonged aerobic culture, but contained numerous polymorphonuclear leucocytes. At this time the provisional diagnosis was "primary pneumonia with pneumococcal peritonitis."

On Dec. 4th she had several syncopal attacks and thrombophlebitis of the left axillary vein was noted. The abdominal distension increased in spite of active treatment, and she finally presented the picture of late generalised peritonitis. On Dec. 10th she began for the first time to cough, and brought up a quantity of very foul blood-stained sputum. The cough continued until her death on Dec. 12th, but there was no further expectoration. It is to be regretted that no examination of this sputum was made.

Post-mortem Report.—Moderate emaciation. Diffuse, almost confluent broncho-pneumonia of both lungs with multiple abscess formation. One abscess at the left base perforating the left dome of the diaphragm on to the upper surface of the left lobe of the liver. Pleuræ markedly inflamed and but slightly adherent. One large vegetation on the mitral valve; the heart otherwise apparently normal. Abdomen showed generalised fibrinoplastic peritonitis with left subphrenic abscess (fluid content slight). Scar of healed ulcer in first stage of duodenum. Mass previously felt in right iliac fossa consisted of distended thin-walled cæcum adherent to anterior abdominal wall. Spleen of septicæmic type. Number of small infarcts in kidneys. The remaining organs showed no unusual features.

Microscopical sections of lung, mitral valve, and stomach were prepared and disclosed: broncho-pneumonia with abscesses containing numerous masses of Gram-positive streptothrix morphologically identical with *Streptothrix actinomyces*; acute fibrinous endocarditis of mitral valve with no Gram-positive organisms and very few leucocytes; acute inflammation of serosa of stomach.

The order of events therefore appears to have been: (1) primary actinomycosis of the lungs; (2) perforation of the diaphragm with production of left subphrenic abscess and generalised peritonitis.

I am indebted to Dr. J. I. P. Wilson for permission to publish this note, and to Dr. W. W. Woods, London Hospital, for his kindness in supervising the post-mortem examination.

A CASE OF
PERFORATION OF A GASTRIC ULCER
IN A BOY OF TWELVE.

BY VICTOR P. ROBINSON, B.M., B.CH. OXF.,
HOUSE SURGEON, ROYAL INFIRMARY, SUNDERLAND.

THE following case of perforating gastric ulcer seems worthy of record.

The patient, a delicate, undersized boy of 12, had been previously in the medical wards of the Royal Infirmary, Sunderland, from March 3rd to May 4th, 1927. According to the notes he had complained of pain in the stomach for three months and of vomiting for two months. The pain was of gradual onset, was sharp and stabbing in character, came on about five minutes after food, and lasted for about half an hour. It was felt in the mid-line of the epigastrium and was relieved by pressure. Soon after the onset of pain vomiting came on and relieved it to a varying extent. His bowels acted regularly. He had lost flesh but gained 4 lb. whilst in hospital. On discharge his weight was 4 st. 13 lb. He had no cough, sputum, nor night sweats. He had had diphtheria. On admission nothing had been made out in his chest or abdomen, and his fæces contained no occult blood as shown by the benzidene test. The urine was normal. He was treated in bed on a verandah, and was dieted, first on milk, then on light diet with fish, and finally on full diet on April 22nd, but he still had some pain.

Two days after his discharge on May 4th his pain got worse, and on May 13th, as he was about to get up in the morning, he was seized with sudden severe abdominal pain, which doubled him up and caused vomiting. He was brought again to hospital, where I admitted him under the care of Mr. S. Raw, honorary surgeon. The boy looked ill and was suffering severe epigastric pain. His temperature was 99·6° F., the pulse-rate 99, and the respiration-rate 28; his tongue was furred, but his teeth were good; the abdomen was rigid, and its movements restricted, especially in the upper half; respiration was thoracic only. He was tender over the epigastrium but not over the appendix. The abdomen was resonant to percussion, the liver dullness was diminished, but there was no shifting dullness. A diagnosis of ruptured gastric ulcer was made.

At 4.40 P.M. on the same day he was operated upon by Dr. Geoffrey S. Robinson, senior assistant surgeon, under chloroform and ether (1 in 32) anæsthesia, through a right rectus incision. Gas escaped on opening the peritoneal cavity, which contained stomach contents. These were mopped up and a perforation 3/16 in. across was found on the anterior wall of the stomach, half way between the fundus and pylorus and nearer the lesser than the greater curvature. The ulcer itself was thick and more than ½ in. in diameter. The opening was closed and the ulcer infolded by catgut sutures with some difficulty, and a piece of omentum was stitched over the suture line. The abdomen was closed without drainage, the muscles were sutured with chromic catgut, and the skin was united with Michel's clips. For some days there was a discharge from the wound and the boy became very ill with broncho-pneumonia, but this cleared up in ten days after he was placed on an open-air balcony. He gradually improved, put on flesh, and was discharged cured on July 23rd.

I am indebted to Mr. Raw for permission to publish these notes.

THE Sheffield Joint Hospitals Council has under consideration the establishment of a hospital at Sheffield to be occupied entirely by paying patients. It is thought that in a city with a population of half a million there ought to be at least 10,000 people who would desire such a scheme and would be willing to pay an annual subscription of £10 10s.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT EDINBURGH.

(*Continued from p. 557.*)

SECTION OF OPHTHALMOLOGY.

WEDNESDAY, JULY 20TH.

THIS Section met under the presidency of Dr. A. H. H. SINCLAIR (Edinburgh), and the first subject of discussion was

OPTIC NEURITIS.

Prof. HENNING RÖNNE (Copenhagen) said that unfortunately the terms choked disc and optic neuritis were employed in different senses, and (what was worse) with differing meanings, by the ophthalmologist and the neurologist. Choked disc meant the condition in which the swollen disc had attained the arbitrarily fixed minimum elevation of 2 dioptres. The important question was whether the neuritis shown in the disc was in the nature of an œdema, indicating increased intracranial pressure, or was an indication of a local inflammation of the optic nerve. It was not always very easy to decide clinically between (1) a primary papillary œdema with functional disturbance resulting from secondary changes in the nerve-fibres, and (2) a primary lesion of the optic nerve with secondary papillary œdema. Behr had endeavoured to introduce a special term for genuine papillary inflammation—namely, papillitis—and to distinguish ophthalmoscopically between papillary œdema and papillary inflammation, but Prof. Rönne thought it impossible to maintain this distinction, for, as a matter of fact, if there was papillitis there was œdema, whatever the producing cause might be. When the inflammation in the optic nerve was situated very far forwards and involved the papilla, there was sure to be round-celled infiltration within the eyeball with opacities in the vitreous humour.

The term "retrobulbar neuritis," said Prof. Rönne, was a clinical expression for a group of diseases in which either there might be no changes in the disc recognisable with the ophthalmoscope, or there might be changes of varying degree, even to the extent of choking of the disc. The most important clinical feature common to the group was the central scotoma. Between the two extremes there were links which showed that they could not be of altogether different origin, and it was a notable fact that in disseminated sclerosis either type might be present. Typical cases of retrobulbar neuritis might show choked disc, the orbital pains might be absent, the tendency to spontaneous improvement might not be evident—e.g., in Leber's atrophy—and areas beyond the macula might be involved, so that it was impossible to depend on any one symptom or sign for purposes of classification. Of great interest was the condition of the medullary sheath. In disseminated sclerosis the sheath was often destroyed, leaving the axis-cylinder naked, and perhaps this might be considered a feature of the entire group; it was certainly present in some cases of diabetic amblyopia. It had been suggested that this might be the real characteristic of the group—namely, that by virtue of a selective action the macular fibres were more susceptible of the loss of their sheath than the peripheral fibres.

Having thus reviewed the three clinical types—papillary œdema, optic neuritis, and retrobulbar neuritis—Prof. Rönne turned to a group not coming strictly under any of these clinical headings—namely, choked disc with sudden initial blindness. This type, he said, was very imperfectly noticed in the literature, and in such a condition the questions obviously arose: Was the sudden loss of sight a direct consequence of the choked disc; or were the two set up, relatively independently, by the same cause; or was the choked disc a consequence of the vision-destroying lesion? He was inclined to accept the last of these explanations. He found as a cause of the blindness a conspicuous plaque, of degenerative nature, arising from complete destruction of the medullary sheath, the place of which was filled with fatty and granular cells. Such plaques might even be present in the chiasma, destroying both optic nerves, and were also to be found in cases of pseudo-tumour with myelitis. Changes in this plaque-formation made it possible to account for those singular cases in which a central scotoma might change into a bitemporal hemianopsia. It was unnecessary to assume that a plaque once formed meant a permanent and distinctive lesion; recovery and resumption of function were not excluded. In the examination of fields, which thus varied from one point to another, Prof. Rönne advocated a movement of the test object along a line at right angles to the edge of the scotoma or blind area, irrespective of the customary circles or radii.

Dr. J. V. PATERSON (Edinburgh) said that the observer should not allow himself to be hidebound by rigid terms such as optic neuritis and choked disc. It was evident that there was a class of cases in which the essential feature was not one precise ophthalmoscopic picture, but the existence of intracranial pressure. In such cases the readings obtained with the Gullstrand ophthalmoscope promised to be of great assistance, and careful investigation must be made of any visual disturbance and of radiograms. For such a group of cases Traquair considered that the term "plerocephalic œdema" should be adopted. Exactly how the œdema produced the ophthalmoscopic picture was not very easy to explain, but apparently the old theory that there was some irritant or toxic substance in the fluid had fallen into disrepute, and indeed the improvement obtained by trephining, and the completeness of the recovery which might result, seemed to negative it. He reminded the meeting of the readiness with which an œdema may come on in the eye, as, for example, the chemosis seen when hordeolum was coming on in the adult. He thought that an analogous condition might explain some of the transitory appearances.

Dr. Paterson quoted with approval Behr's description of the fundus in the retrobulbar type of neuritis, but remarked that it was well nigh impossible to make any differentiation of type by the ophthalmoscopic appearance alone, and these cases certainly did not form a group so clearly outlined clinically as the plerocephalic series. They might be classified, however, into certain subgroups, of which two were of more importance than the rest: (1) A small group in which inflammation of the nerve had spread by contiguity; in these cases the periphery of the field seemed to be involved rather than the centre, and among them were cases of optic atrophy in children with a positive Wassermann. (2) A large group due to toxins circulating in the blood; in some of these cases the nerve head exhibited definite changes, if the focus was near to the globe. Usually one eye only was affected, and there was a strong tendency to complete or nearly complete recovery. He expressed himself as very sceptical of the alleged close and frequent relation between disease of the nasal sinuses and retrobulbar neuritis; his experience gave little or no confirmation of such a view, though he did not deny that such a relation might exist. The ophthalmic surgeon faced with a case of retrobulbar neuritis might often feel called upon to invoke the assistance of the rhinologist, but among all his cases of nasal disease did the rhinologist ever find his patients complaining of loss of sight?

There were also certain other minor groups, besides those of diabetic and tobacco amblyopia, which were not included in the subject under debate.

Dr. A. J. BALLANTYNE (Glasgow) said that the consultant ophthalmic surgeon had chiefly to deal with (*a*) papillœdema connected with intracranial tumour, meningitis and other central disease, and (*b*) the optic neuritis or neuroretinitis of renal disease. Often the earlier stages might be unobserved, for there were no visual disturbances to call attention to the eye. It was impossible altogether to distinguish between optic neuritis and choked disc with

prominence of the disc amounting to 1·5 dioptres or more, because such an œdema must have passed through an earlier stage indistinguishable from optic neuritis; in any given case of this type an apparent optic neuritis might be a choked disc in its early stage. He deprecated too ready acceptance of clinical records of recovery of vision in retrobulbar neuritis after operations—e.g., on the nose—as such cases had a tendency to recover spontaneously, and false conclusions might readily be drawn from the history. He was in favour of a conservative attitude in regard to operating; possibly in some cases the benefit after operation had been due merely to local blood-letting, ventilation, or to the use of adrenalin. He would certainly not be disposed to resort to operative treatment until six weeks had been spent in milder measures. After describing a number of cases under his care, Dr. Ballantyne concluded by saying that when choked disc occurred after fracture of the skull it was often attributed to hæmorrhage into the sheath of the nerve, but he had one case in which this could not possibly be the explanation, since the patient had retained excellent macular vision.

Prof. VAN DER HOEVE (Leyden) thought it not altogether disadvantageous to have the two names, choked disc and optic neuritis, but said it was a pity when they were confused, and employed without sufficient attempt at precision. Uhthoff's rule of swelling to an extent of 2 dioptres was not meant to be read too rigidly. He thought that operation in cases of choked disc was best done when vision was just beginning to fail, and inasmuch as it was never possible to be absolutely certain of the diagnosis, it was wise to operate, as otherwise blindness was certain, though the patient might live a long time. He did not advise operation when there was choked disc with sudden initial blindness. In all head cases the coöperation of radiologist with neurologist (or rhinologist) and ophthalmic surgeon was essential, and the last-named ought to be as familiar as possible with X ray photographs of the skull. By employing the ophthalmoscope during the operation Prof. van der Hoeve had satisfied himself that it was the opening of the dura which was the essential point in relieving the pressure-œdema. He agreed that the relation between retrobulbar neuritis and the nose was real, but thought that its importance was greatly exaggerated.

Dr. H. M. TRAQUAIR (Edinburgh) said that it was unjustifiable to use a term ending in "itis" unless it was certain that actual inflammation was present. He preferred the term "plerocephalic œdema" for a large proportion of the cases with choked disc. He rather thought that the central scotoma after hæmorrhage was not a true retrobulbar neuritis, but a toxic effect due to the hæmorrhage. Tabetic atrophy he suspected of being a form of neuritis.

Dr. GEORGE YOUNG (Colchester) described a case in which choked disc appeared within a few hours after a head injury which had produced a large intracranial hæmorrhage. The patient was promptly trephined, the hæmorrhage was stopped, the blood-clot was removed, and the result was complete recovery.

Sir JOHN PARSONS (London) regarded Prof. Rönne's explanation of the occurrence of plaques in disseminated sclerosis as very important.

Dr. G. E. DE SCHWEINITZ (Philadelphia, U.S.A.) laid down two rules in regard to operation in choked disc—viz., that time must be taken to make a thorough conservative investigation of all the facts, and that when any interference with vision could be discovered (e.g., enlargement of the blind spot) by refined methods, operation should be promptly performed. At a late stage operation did no good visually, though it might be required for the relief of pain.

Prof. W. H. WILMER (Baltimore, U.S.A.) had seen cases in which opening up of the sinuses had given great improvement in cases of central scotoma with neuritis, but if it was to be of service the operation must open up the cells immediately surrounding the nerve canal.

Prof. W. H. WILDER (Chicago, U.S.A.) agreed with Dr. Paterson about the transitory œdema in the neighbourhood of a focus of inflammation, and thought that Prof. Rönne's plaques might be of the nature of some such pre-inflammatory change.

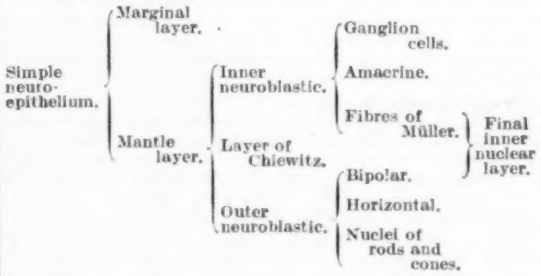
THURSDAY, JULY 21ST.

At the second session of the Section Miss IDA MANN (London) read a paper on the

Comparative Development of the Retina.

Her paper dealt mainly with two aspects of the process of differentiation in the developing vertebrate retina. In the first place, it was shown that there is a definite sequence of events in the development of the retina, which holds good in any animal of the vertebrate type so far examined. In the second place, attention was drawn to the rather curious mode of development of the amacrine cells, which empirically show very close connexion with the ganglion cells, though in the adult state they are much more intimately associated with the bipolar cells. The retina, said Miss Mann, is evolved from the simple neuro-epithelium of the optic cup by a process of separation of the nuclei into layers. At first only one layer of nuclei can be recognised. Very early, however, two zones, an inner and an outer neuroblastic layer, become visible, separated by an interval, the transient fibre layer of Chiewitz. From the inner neuroblastic layer are differentiated the ganglion cells, the amacrine cells, and the nuclei of the fibres of Müller. From the outer neuroblastic layer come the nucleus of the bipolar cells, the horizontal cells, and the nuclei of the rods and cones. The final stage is reached by the disappearance of the transient fibre layer of Chiewitz and the consequent blending of the amacrine and Müllerian fibre nuclei with the bipolars to form a definite inner nuclear layer. The transient existence of the amacrine cells as a separate layer is most marked in birds and in the fovea centralis in man, though it may also be present in other vertebrates. When marked, it is possibly associated with a final high grade of functional activity. Only in birds is the same height of development reached as in man, but in the birds this development is over a large area, whereas in man the process reaches its height in the macula only.

The following diagram was shown to illustrate the development of the retina:—



Sir WILLIAM LISTER (London) read a paper on

Detachment of the Retina.

It was necessary to make a selection, he said, of those cases of simple detachment which were suitable for treatment. Certain cases gave a reasonable chance of success; others gave none. When both eyes were affected, or when there was only one seeing eye, there was probably no reasonable chance of success, and it was best to mark time, to make the patient feel that everything was being done, and to employ rest in bed, bandages, &c. It was on the question of treatment in cases of detachment occurring in one eye only that there seemed to be divergent views. In spite of articles in the press claiming successes amounting to 100 per cent. the real prospect of restoring sight was very slight. Only those cases in which there was reasonable chance of success

should be subjected to operative treatment. Unsuccessful treatment meant not only monetary loss to the patient, but loss of prestige to the operator and his profession. Some surgeons frankly stated that the condition was hopeless; some never advised anything beyond rest, which might consist of lying down for 20 minutes, or of complete rest with the head never lifted from the pillow for weeks. The majority, he imagined, advised rest, constitutional treatment, and counter-irritation, and if these were unsuccessful, then resorted to operation. He had reason to think that a large number of cases were treated on a purely routine plan without any endeavour to find the cause in the individual case; but sometimes it was possible at least to make a reasonable guess at the reasons for detachment. The detached retina had either been pushed off the choroid from without or dragged in from within or floated off through a hole in the retina. When it was dragged in by cicatricial bands in the retina itself, operative treatment could be of no avail, but if the bands were formed in the vitreous, it was not impossible that benefit might result from their division. There appeared to be a general consensus of opinion that when holes were present operative treatment was contra-indicated, and that had been the conclusion of a committee of the Ophthalmological Society (1916). It was, then, of vital importance before deciding upon operation to be satisfied that no hole existed. As a matter of fact, however, careful examination would not show a hole in an invisible part of the fundus. The retina at the edge of the hole was always rolled inwards on itself, and often showed cystic degeneration—so much so that the existence of a hole had been attributed to the rupture of one of these cysts. Round it the vitreous was often somewhat denser; at points there might be a firmer attachment than was normal between retina and choroid. When the surgeon was confronted with a case giving no obvious clue to the actual cause of the detachment, and with nothing definitely to contra-indicate operation, it was best to spend a fortnight on such measures as rest in bed, absorptive treatment, counter-irritation, and subconjunctival injections. If these failed, operation should be done. The treatment ought to be thoroughly and sufficiently carried out, and the patient should have no reason to feel that he had missed any fair chance that operation or other measures might have afforded him.

Dr. W. CLARK SOUTER (Aberdeen) read a paper on

Spontaneous Reattachment of Detached Retina.

After giving short notes of six recent cases (two traumatic, two idiopathic, one myopic, one during pregnancy) in which a gross detachment of retina had apparently disappeared, leaving choroidoretinal atrophy-like changes in three cases, retinitis striata in two, and an apparently normal fundus in one case, Dr. Souter discussed the pathological findings in published cases in which reattached retinæ had come to the microscope, special mention being made of the cases of Rönne and Klainguti. In one of his cases of retinitis striata—an idiopathic one—watched over 17 years, the long white band at the edge of the reattached area was crossed by vessels which were obviously not retinal, and not likely to be choroidal, but rather like new vessels. They had a strong resemblance to, and offered a possible explanation of, those cases described by Sir William Lister in the *Ophthalmic Review* for 1903 under the heading Angioid Streaks of the Retina.

Dr. R. A. KERRY (Montreal) was convinced that in certain cases injection of iodide had been of immediate and permanent value.

Mr. INGLIS POLLOCK (Glasgow) read the reports of two cases of detached retina in which recovery occurred after operation. In the first case there was a relapse, and although the patient had to wait six months for readmission to the infirmary, the operation was successful in restoring the retina to its normal situation; that was seven years ago, since when there had been no recurrence. In the second case—a traumatic one in a myope of 9 dioptres—one operation sufficed, and the patient had had no recurrence since it was performed six months before. Both cases showed that there was no improvement until the inter-retinal fluid was withdrawn; in fact, both patients became worse while they lay at home with both eyes bandaged, and the first showed the success of the operation in spite of the recurrence of the detachment. Mr. Pollock further said that he had seen a small detachment cured by operation, followed by recurrence of the detachment and subsequent complete loss of sight in the eye by the extension of the detachment all over the fundus.

Sir ARNOLD LAWSON (London) told of spontaneous reattachment in two apparently hopeless cases. The first was that of a woman with changes in the fundus and vitreous, chronic colitis, and neurasthenia. A few months ago she acquired a very large shallow detachment of the retina below. She would not rest in bed—"it was like trying to keep a pea in a frying pan"—and was quite an unfit subject for an operation. Some time later she returned saying she had recovered her sight. The detachment had entirely gone, and so far there had been no signs of any recurrence. The other case was that of a lady of 70, very stout and plethoric, who had an enormous black "umbrella" detachment, due no doubt to hæmorrhage. She scoffed at the idea of remaining in bed. In reply to a question as to her other eye, she was told that it was in no special danger, but that she must be careful not to hustle or overexert herself in any way, and to avoid stooping. As the second eye was sound she determined to have no treatment. Some time later, anxious to meet her daughter at a station, she ran up the hill, arrived at the top all hot and breathless, and remarked to her daughter, "Good gracious, I can see!" The retina was found to be in position, and had remained so.

A short discussion followed, after which Sir ARNOLD LAWSON read a paper on the value of

Antiseptics in Modern Ophthalmic Surgery.

There were, he said, three obvious sources of infection in ophthalmic surgery. The first was from contamination of the conjunctival sac. The second was from instruments and dressings; and in this matter too much care could not be taken. The third was from the surgeon's fingers. In Sir Arnold Lawson's opinion gloves interfered so seriously with the sense of touch that they could not be used; but since the hands could never be made strictly sterile, great precautions must be taken to prevent contact with the business part of any instrument or suture. In the event of any such accident the immediate use of flavine (1 in 1000) was to be relied on as efficient and yet not irritant; it had, however, no power of penetration. He considered that it did not delay healing, even when used daily in a strength of 1 in 4000. It was useful, too, as well as protargol, when the lash region and the ciliary margins were not entirely healthy. He had great faith in hydrogen peroxide when it was necessary to take risks and operate in presence of a septic condition of the eye.

Dr. H. M. TRAQUAIR (Edinburgh) read a paper on the

Incidence of Tobacco Amblyopia in Edinburgh and District.

Cases of this condition, he said, had been found to be about 1 per cent. of the out-patient cases during a number of years. Four male and one female patients had contracted the disease from cigarette-smoking. By comparing the curve of frequency of tobacco amblyopia with that of arrests for drunkenness, he showed that there was no similarity in the incidence, and this made it very improbable that alcohol was in any degree the underlying cause, as was sometimes believed. Furthermore, the Edinburgh patients with tobacco amblyopia were almost entirely of the respectable working class. He related the cases of three persons who had become blind from drinking methylated spirit, in one of which a man of 40 actually drank a pint a day for four months

before symptoms came on. No case of tobacco amblyopia ever proceeded to complete blindness, and an interesting feature was that vision sometimes became worse for a time after smoking had stopped. There was very often some precipitating cause, whether physical or psychical; and though the amblyopia was never unilateral, there were indications that one eye might be affected rather earlier and perhaps more deeply than the other.

Prof. VAN DER HOEVE stated that he never saw cases of tobacco amblyopia in Holland; he did not believe that it ever occurred, but he could not tell why.

Dr. DE SCHWEINITZ said that he himself had never seen a toxic amblyopia of this particular type in a drinker who was not a smoker, and only two cases in smokers who were absolutely teetotal.

Dr. F. H. DIGGLE (Manchester) read a paper, chiefly statistical, dealing with the relationship (or rather non-relationship) between nasal disease and lacrymal obstruction.

The PRESIDENT (Dr. SINCLAIR) performed before members of the Section his special operation of extraction of cataract in the capsule.

SECTION OF RADIOLOGY.

WEDNESDAY, JULY 20TH.

THIS Section met under the presidency of Dr. J. M. WOODBURN MORISON (Edinburgh) and the subject first discussed was

X RAYS IN THE DIAGNOSIS OF INTRATHORACIC GROWTH.

Dr. STANLEY MELVILLE (London) pointed out that in pre-radiological days there were but few publications dealing with intrathoracic neoplasms, and such as there were dealt with the matter only from the standpoint of morbid anatomy. Out of 74 cases reported in 1904 by Sehrt, in six only had a correct clinical diagnosis been made. Our forebears could go no further as regards the diagnosis than the symptom-complex of increased intrathoracic pressure. Intrathoracic new growths were believed to be very rare and the prognosis was considered hopeless.

It was customary to classify intrathoracic new growths as benign and malignant, but only in the pathological sense. Dr. Melville asked if this distinction could be drawn, for every intrathoracic new growth, however benign, must in time kill the patient by pressure. This fact must be appreciated by clinician and radiologist on account of the vital necessity of early diagnosis. Unfortunately, even true malignant neoplasms had an insidious onset and grew to a considerable size before causing dyspnœa from pressure. He considered that, on the first evidence of even occasional breathlessness which could not be accounted for, radiological examination was indicated.

Benign Neoplasms.

Benign neoplasms were for the most part extra-pulmonary.

Fibromata gave rise to rounded, well-defined opacities springing from the posterior thoracic wall and pushing forward the lung rather than invading it. Owing to the non-irritant structure of the growth there was seldom any pleural adhesion, and diagnosis was rendered easy by the production of an artificial pneumothorax. When this was done an isolated free tumour which was extra-pulmonary could be made out. This procedure was of great value in the differential diagnosis between fibroma and fibro-sarcoma.

Teratomata occurring in the thorax were generally of the dermoid type, of epiblastic origin, and containing any of the constituents of skin and its appendages. Growing from the third branchial cleft or the remains of the thymus, they were anterior in position in contra-distinction to the fibromata. Dr. Melville had seen as many as five dermoid cysts at the Brompton Hospital in the last 12 months. The most important point in the radiological diagnosis was the examination in the dead lateral plane, when the tumour was seen to lie anteriorly close to the sternum, being fairly well-defined, but often markedly irregular.

Malignant Neoplasms.

Dr. Melville quoted statistics of pulmonary carcinoma from the year 1886 to the present day, and pointed out the apparent increase in the incidence of this disease in all countries. He questioned the real existence of primary sarcoma of the lung, as opposed to lympho-sarcoma arising from the mediastinal glands and, therefore, primarily mediastinal. Metastasis from some undiscovered primary focus, such as the prostate, might account for some of the recorded cases.

Finally, he discussed mediastinal new growths, laying stress on the difficulty of the differential diagnosis from aneurysm of the thoracic aorta. If the condition had persisted for 18 months or more, aneurysm was the more probable. The diagnosis might depend on the occurrence of erosion of bony structures which seldom occurs in mediastinal sarcoma. He concluded his paper by inviting discussion of the question, Is the increase in the incidence of primary pulmonary carcinoma real, or is it possible that many of the cases now recognised as carcinoma were previously mistaken for pulmonary tuberculosis, especially of the fibroid type?

Discussion.

Dr. THURSTAN HOLLAND (Liverpool) said that he did not believe that the increase in the incidence of primary pulmonary carcinoma shown in the statistics was a real one. He attributed it to more accurate diagnosis. Discussing the differential diagnosis of mediastinal new growth and aortic aneurysm, he laid great stress on the observation of a definite expansile wave-like pulsation passing along the margin of the shadow; this appearance he regarded as pathognomonic of aneurysm.

Dr. A. E. BARCLAY (Manchester) thought the time had come when the text-books of clinical medicine should be revised in the light of radiological knowledge. As an example, he mentioned the physical sign known as tracheal tugging, which was so much stressed as a sign of aneurysm in the books. He had failed to elicit it in a large number of cases in which he had proved, by X ray examination, the presence of an aneurysm of the arch.

Sir HUMPHRY ROLLESTON (Cambridge) said that he regarded tracheal tugging as a sign which was of value.

Lord DAWSON OF PENN thought that the radiologist should take a greater part in the teaching of clinical medicine. He suggested that in cases in which the radiological examination was an important factor in the diagnosis, the radiologist might with advantage discuss it, and the conclusions to be drawn from it, before the students, immediately after the demonstration and discussion of the case by the teacher of clinical medicine.

The PRESIDENT then described the system of undergraduate instruction in radiology in force at Edinburgh University, and the discussion was continued by Dr. N. S. FINZI (London), Dr. CAMPBELL SUTTIE (Glasgow), Dr. ROWDEN (Leeds).

In his reply, Dr. MELVILLE said that he placed no reliance on the presence or absence of pulsation in the differential diagnosis of aneurysm. A tumour might show violent transmitted pulsation, while an aneurysm with thickened, calcareous walls might show none.

The second discussion of the Section was presided over by Dr. R. E. ROBERTS (Liverpool), the subject being

X RAYS AND RADIUM IN THE TREATMENT OF CARCINOMA OF THE BREAST.

Dr. N. S. FINZI (London) said that it was generally agreed that cancer started as a local disease, or at any rate a local manifestation. Generally it tended

sooner or later to spread, at first by the lymphatics and later, in some cases, by the blood stream. If the disease was completely removed while still local, whether by surgery or by irradiation, the patient would be cured. If, however, it had spread beyond the area removed, or beyond the area to which a sufficiency of irradiation has been given, growth recommenced. Consideration of the lymphatic drainage of the breast showed that when the primary growth was in the outer part of the breast further trouble might be expected first in the axillary and subclavicular glands and later in the supraclavicular glands and posterior mediastinum. If the growth was in the inner part of the breast, the inner end of the intercostal spaces and the anterior mediastinum were the danger zones. If it was in the upper part of the breast the supraclavicular glands were to be suspected. In advanced cases the disease often invaded the pleura, possibly by the sternal or intercostal glands, possibly by way of the mediastinum. The cells would eventually reach the blood stream by the thoracic duct. Involvement of the mediastinal, tracheal, and bronchial glands might often be discovered by a skiagram, as also pleural metastasis and blood-disseminated metastases in the lungs. They could not be seen in the early stage, being only visible when in the form of definite tumours. Skiagrams, both anterior and antero-lateral, should be taken of every breast carcinoma for X ray treatment.

Radium Rays and X Rays.

The low penetrating power of the α rays made them of no importance in therapy. The same remark applied in a large degree also to the β rays, much better results having been obtained by γ and X rays. It was found that there was a certain minimal dose which would inevitably prevent the development of experimental growths. This was the so-called lethal dose, and would cause the growth to be absorbed by the tissues of an animal into which it was implanted, and would then immunise the animal against future implantation of similar growth. Larger doses would equally prevent the development of the graft, but would not immunise to the same degree, and when about 20 times the lethal dose had been given the graft no longer immunised. Sublethal doses reduced the ratio of successful implantations without in every case preventing them. The lethal dose was much higher than could be applied to the living tissues without causing necrosis. In the human being in general the more rapidly growing the neoplasm the more rapidly would it succumb to irradiation. But as rapidly growing tumours spread more quickly, a wider area and more distant glands would need to be treated, and a greater number of cases would show distant metastasis. With rapidly growing tumours the effect of the rays was seen quickly—in a day or two—whereas with the more slowly growing forms changes might not appear for some weeks. As the wave-length of X rays decreased so their effects took longer to appear.

The γ rays produced an effect in about the same time as X rays produced by 150 k.v. continuous current. Dr. Finzi believed that the response to X rays of carcinomata and epitheliomata was better the higher the wave-length, if full doses were given. Consequently γ rays were the best if applied in sufficient quantity. Lymphosarcoma, however, probably responded at least as well to medium wave-lengths. X rays could easily be obtained in large quantities; on the other hand, radium could conveniently be applied for prolonged periods. In the rare instances in which large quantities of radium could be secured they were not concentrated into a point focus, but spread over a large radiating surface so that the relative depth was much increased. Radium rays were more penetrating, and for the same amount of damage to healthy tissues, exerted more effect on carcinomata than X rays. The disadvantage was that the underlying lung must get a large dose and subsequent damage was likely. On the other hand, with X rays the use of the glancing method would largely prevent this. Radium was also used by burying a number of radium containers in the tissues; usually hollow needles containing either radium salt or radon were employed. The needles were used deep to the growth if possible, or in its deeper layers, the gland areas being needled at the same time. Dr. Finzi had the impression that the results with buried radium were better than the external methods, provided the wounds remained aseptic. This could only be accomplished by meticulous care owing to the devitalising effect of the irradiation upon the tissues.

Treatment.

Dr. Finzi discussed the actual treatment of cases under the following headings, speaking first of treatment by irradiation alone.

(1) *Primary growth localised in breast; no palpable glands.*—In an operable case without contra-indications for surgery, irradiation should not be used unless the breast was to be subsequently removed, but the loss of time, possibly of two months, involved in preoperative irradiation was probably more than compensated for by the diminished likelihood of insemination of the growth at operation. In many cases it had been possible to render inoperable growths inactive for long periods by X rays, but their complete disappearance had been rare. The results with radium had been more encouraging.

(2) *Primary growth in breast; palpable glands in axilla.*—Treatment by irradiation largely depended on the radiographic appearances. If mediastinal involvement was seen, nothing but mediastinal treatment was of any value, and as this usually prevented efficient doses being given to the breast and axilla, the question of surgical help must be considered. If the mediastinum did not appear to be involved the breast should be treated as if operable, and the subclavicular and supraclavicular regions must be irradiated. If the mediastinum was subsequently found to be involved it could be treated with X rays.

(3) *Primary growths with supraclavicular deposits on the same side* must always be regarded as affecting the mediastinum, and unless mediastinal treatment could be adopted with correct dosage of the breast, axilla, and supraclavicular regions with X rays, no permanent success was possible. Combined radium and X ray treatment might be useful.

(4) *With definite mediastinal involvement.*—Until recently Dr. Finzi said he had regarded cases with definite mediastinal involvement as almost hopeless. Recently, however, several cases had done extraordinarily well. It was more than three years since his first case had been treated by his present technique and the patient was still well.

(5) *Treatment of distant metastases.*—Bone metastases were usually very painful and there might for a time be only one or two. Treatment gave so much relief that it could not be refused, even although it was certain that the patient would ultimately succumb to other metastases.

The general lines of treatment for local recurrence after operation were similar to those for a primary growth. With distant recurrence in the axilla and coracoid region and mediastinum, the treatment would be the same as when the primary growth was present. Distant metastases must be dealt with on their merits, but they were worth treating on account of the great relief from pain, lasting for many months, which could often be given.

With regard to post-operative prophylactic treatment, Dr. Finzi held that the methods used should be exactly the same as when there was a demonstrable recurrence and the doses should be just as full. The assumption was that some disease still remained and the most thorough methods should be used to eradicate it.

After-Effects of Irradiation.

Immediately after treatment some patients suffer from sickness which might be considerable; this could be much diminished or even abolished by certain precautions. Spreading of the treatment over several

days was effective and the good ventilation of and exclusion of all corona discharge from the treatment room was important. The administration of gr. x. of chloretone before the treatment, and three times a day during it, was also of use.

After describing the effects of excessive irradiation of the skin, Dr. Finzi explained that when effective doses were used on the chest wall it was difficult to prevent the lung from receiving large doses. Many such cases would later develop a characteristic lesion of the lungs. It did not occur in all cases unless the dose had been very large. The acute form produced by a large dose of irradiation within a few days showed itself first as a pneumonic patch in the lung; later the typical radiographic appearances of bronchiectasis developed, generally, however, without the symptoms of that condition. In the chronic form caused by irradiation at intervals over a long period, the changes were similar, except that the pneumonic stage was not observed. In the final stage the patient was usually unconscious of any abnormality, but in one acute case a typical bronchiectasis remained.

Technique and Results.

Technique was discussed with special reference to the glancing methods devised by Dr. Finzi and also by Holfelder of Frankfurt. Dr. Finzi said that he used continuous high-tension current at 170 to 185 k.v. Radium might be given by needling, or by external applications in which the radium is supported at a distance of some 3 cm. from the surface of the skin, tubes being distributed at intervals over moulds of special wax or a splint of thin celluloid or wood.

Discussing results, Dr. Finzi said that palliation and prolongation of life were the rule, cure the exception; but undoubtedly the radiologist ought to get the patient at an earlier stage than was the rule at present. The use of radium needling followed by extirpation, if desired, in earlier cases, seemed to offer a better chance of cure than operation with subsequent irradiation; but prophylactic irradiation was not to be withheld if operation was preferred.

Discussion.

Dr. DOUGLAS WEBSTER (London) said it was no longer true that the only chance for the patient with cancer of the breast was early operation. Some radiologists had now had results similar to those of irradiation treatment of cancer of the cervix—namely, cures in a certain percentage of inoperable cases, and results in operable cases equal to or better than those of operation. He thought the mortality from cancer was more likely to be lowered by an extension of radiological methods than by any other means known at present. Owing to the natural repugnance to operation felt by most patients, and their delay in admitting that they had a lump in the breast because they had no pain and feared that an operation would be forced on them, a large proportion of patients came first under observation at a late or too late stage. Patients would report earlier if they knew there was an alternative treatment to operation. Operation in a very considerable percentage of cases was incomplete, as nearly a third of the post-operative irradiation series had shown small early recurrences, most of which disappeared with further irradiation. A considerable number of rapidly recurring cases had been met with, which appeared to confirm clinically the experimental observation that the best way to make an animal tumour grow was to cut into it. Because of the deaths of so many of these recurrent patients preoperative irradiation was strongly advocated, to sterilise the tumour and its lymphatic drainage areas before operation. The surgery of cancer in this sense was in a pre-Listerian stage, because of the incalculable risk in any given case of dissemination of active tumour cells and local recurrences. Dr. Webster gave statistics from 512 cases of breast cancer treated by X rays and radium, showing the proportion of successes and failures met with in recurrent, prophylactic (post-operative), and primary cases treated. In his view, in breast cancer, as already in rodent ulcer and in cancer of the cervix and tongue, irradiation was tending to become the primary, and surgery the secondary, method of treatment.

Dr. M. R. J. HAYES (Dublin) then described his results, exhibiting large diagrams showing the results of treatment of carcinomata at various stages.

Dr. A. E. BARCLAY (Manchester) doubted whether the results of X ray treatment with the high voltages now available were in any degree better than were obtained years ago with what was termed medium-voltage therapy.

Dr. R. E. ROBERTS took a gloomy view of the results of the X ray treatment of breast carcinomata.

The PRESIDENT asked of those irradiating any malignant growth the question—What exactly are you hoping to do to the tumour? If it was hoped for complete destruction of all the malignant cells, that was a physical impossibility. He could show a section of a heavily irradiated malignant growth in which, side by side with cells so completely destroyed as to show calcification, were others which were still actively growing.

SECTION OF MENTAL DISEASES.

WEDNESDAY, JULY 20TH.

WE have already reported (THE LANCET, August 6th, p. 277) a meeting of this Section held in conjunction with the Royal Medico-Psychological Association. Another joint meeting with the Association was held on July 20th, under the presidency of Dr. HAMILTON MARR, when the subject of discussion was

CHRONIC SEPSIS AS A CAUSE OF MENTAL DISORDERS.

Dr. WILLIAM HUNTER (London) said that the mental conditions chiefly aggravated or caused by sepsis were dementia præcox, manic-depressive insanity, paranoid conditions, psychoneuroses, and the toxic insanities. He had made a special appeal for the study of focal sepsis in 1900, and after 20 years a response had come in the energetic work of Dr. H. A. Cotton, of the New Jersey State Hospital, in 1923.[1] Since then more and more attention had been paid to the subject in this country.

Surgical sepsis was generally an obvious complication with easily recognisable lesions, caused by only two or three kinds of organism. Medical sepsis was much more complex. Its foci were small, hidden, and chronic, and generally caused no local effects. The organism responsible was usually a streptococcus, but this might be of any one of 16 strains differing not in their cultural features or reaction to sugars, but in their selective action on the different systems of the body. This fact had been dramatically shown by the work of Rosenow in 1914–16.

In 1916 Dr. Cotton had admitted into hospital a woman whose case was of definite historical interest. Her father had died of melancholia at 64, and on the death of her mother from paralysis at 80 she had become depressed, agitated, and self-accusatory. Her upper teeth were missing and her lower badly decayed. After two years 11 bad teeth were extracted, and two months afterwards she had permanently recovered. This case aroused his interest in sepsis as a causative factor in mental disease, and had marked the starting-point of his fruitful work in this field. It showed the usual ætiological factors; heredity and the psychogenetic factor of the mother's death, either of which might account for the condition. It had nevertheless been cured by the removal of the most uninteresting feature of the trouble. Her disorder was, in fact, a "septic psychosis." Dr. Hunter also recited another case, this time of acute mania simulating dementia præcox, which had yielded to the extraction of four impacted molars. The problem was whether to wait till the symptoms abated, or to operate while the patient was still violent. Each case must be judged on its merits, but the risk of operating was one which could be safely run. Impacted and

[1] Journal of Mental Science, October, 1923.

unerupted teeth were frequently associated with mental disorder; in 120 patients of Kopeloff and his colleagues, reported on in 1923, 15 had 49 such teeth. In Dr. Hunter's judgment the dental history and degree of sepsis found in the cases he had quoted were common to most of the cases of severe mental disorder in children and adolescents.

The commonest form of psychosis was the "septic" psychosis; sometimes it existed alone, but it was more often a complication of other and severer conditions, and the best hope that any psychotic patient could have was that his trouble might prove to be largely or entirely due to the influence of a septic focus. In Dr. Cotton's experience the teeth of all patients, whatever their sex or the nature of their psychosis, were infected. The stomach was a septic focus in 83 per cent. of men, the tonsils in 76 per cent., and the seminal vesicles in 2 per cent. In 10 per cent. there were serious lesions of the colon. Of women 73 per cent. had septic tonsils, 76 per cent. a septic stomach, 80 per cent. a septic cervix, and 30 per cent. serious colonic lesions. The observations of Dr. T. C. Graves had given similar results. His figures for teeth and tonsils were lower than those of Dr. Cotton, but his figures for the cervix corroborated the American ones, and he reported a high incidence (39 per cent.) of ear sepsis and a 10 per cent. incidence of nasal sinusitis. The relative importance of the various foci, said Dr. Hunter, depended not on the respective incidence in them of sepsis, but on its virulence, amount, and chronicity. The important factor in oral sepsis was the number of sockets, rather than the number of teeth, affected. Its degree depended also on other conditions, such as septic gingivitis, tartar deposit, pyorrhœa, the number of devitalised and crowned teeth, buried roots, unerupted teeth, &c. Gold bridges were an important source of sepsis, of a kind particularly liable to produce neurotoxic effects. Teeth harboured much more infection than tonsils ever could, especially since bony tissue was involved. This last factor explained the virulence of nose and ear infections. Dr. Hunter welcomed a new era in psychiatry, in which the first measure of treatment should be the removal of all septic foci with the help of the surgeon and radiographer; when every mental hospital should be as well equipped and staffed for dental and surgical work as it was now for medical work. He expected the greatest triumphs of this new application of antisepsis, however, in the realm of prevention.

Discussion.

Sir BERKELEY MOYNIHAN (Leeds) spoke of the relation of septic foci to gastric and duodenal ulcers. Cardiac conditions, he said, could be much improved by the treatment of gall-bladder lesions in particular, and all had a septic origin except congenital heart disease. If operation on distant organs could benefit the heart it could also benefit the mind. He had operated on mental patients for gall-bladder, in the face of opposition from physicians and relatives, with considerable success for 30 years. The progress of surgical knowledge of the abdominal viscera was hampered by the lethargy of physiologists, who would do well to bring their researches more closely into line with clinical requirements. It was a mistake to withhold surgical aid on account of the severity of the mental state; as the speaker put it, he never let a patient die of one disease because he happened to have another as well. He wanted to know why some patients with septic mouths withstood infection while others fell easy victims. The question must be bound up with the problem of immunity, about which the greatest authorities knew practically nothing. Sir Berkeley Moynihan hailed the recognition of the medical effects of sepsis as the most illuminating discovery of the century.

Dr. CHALMERS WATSON (Edinburgh) said that in investigating for sepsis it was essential to study the urine. The condition of the stool was another valuable source of information. Nearly every case of mental disorder, migraine, and the troubles of everyday life, was associated with some septic discharge from the bowel. This could easily be proved by a double Plombières douche, for whereas the second injection into a healthy bowel came back almost perfectly clean, from a toxic bowel it was returned nearly as turbid as the first. This result, obtainable from 99 out of 100 patients in a general or mental hospital, gave clear proof of a severe disturbance of the balance between the saprophytic growths and the forces which kept them within bounds. Cleansing of the colon was therefore an important therapeutic measure.

Dr. H. A. COTTON (New Jersey, U.S.A.) said that every mental patient was sick physically, though he might have a deceptively healthy appearance. He recalled good results from non-protein irritant therapy, in the use of which, however, Birmingham had surpassed anything he had seen. A method had recently been adopted in America which fulfilled Dr. Watson's suggestion of cleansing the colon. It gave excellent results, but needed a conscientious nurse to operate it; it was a Plombières douche prolonged to an hour and a half or two hours, using about twenty gallons of water, and was given before abdominal operation. Dr. Cotton considered that American work on the colon was more highly developed than anything else in this branch of medicine. He laid stress, however, on the importance of clearing up all the primary foci as well. The "overload" factor was too often forgotten. When a focus was removed, the overload causing the more obvious symptoms was relieved and the patient improved, but that did not mean that he was yet free from severe handicap. Other foci must be looked for, or the trouble might return. In support of Dr. Hunter's concept of the "septic psychosis," he remarked that many people might have sepsis and avoid insanity, just as many people might drink to excess and remain sane; there was, none the less, alcoholic insanity. Though he was enthusiastic about irrigation, he advocated picking and choosing, and believed in any method that produced results.

Dr. T. C. GRAVES (Birmingham) referred to Bruce's "Studies in Clinical Psychiatry," published 21 years ago, in which appeared the fundamental conception that the real disease lay deeper than the chronic toxæmia, and was rather a failure to form antibodies. He described a typical case, cured by non-specific protein therapy and by surgical treatment.

The patient was a single woman, born in 1906 when mother was aged 44, and the youngest of five. The mother, though never certified, had had three nervous breakdowns and suffered from gross oral sepsis. Three other children had chronic nasal disease. At 3 years old patient had scarlatina with left otitis media; the discharge continued till she was 8 and there was recurrence in her teens. She was clever at school, reserved, good at music, and possessed initiative and thought for others. She was never alert, however, and delayed in answering questions. Menstruation occurred once each at 16, 17, 18, and 18½. At last age the aural discharge became profuse and made her leave work. After mastoid operation next year periods became regular, 4/28. Patient at this time became depressed and developed ideas of persecution. Auditory hallucinations developed, and she was certified in July, 1926. On admission she showed complete disorientation and was noisy, mischievous, and violent. She manifested catatonia and waxy flexibility. These symptoms coincided with the pre-menstrual phase. The skin showed chronic papular staphylococcal eruption. There was discharge from left ear; the tonsils were small and septic; there was pus in right nose, mucopurulent discharge from endocervix. A carious tooth was extracted.

Eight intravenous injections of T.A.B. vaccine were given at five-day intervals during August. No immediate mental improvement followed, but the patient ceased to lose weight. The permeability of the choroid plexus was 3·64, lower than normal. In September she became more composed, though depressed—a reversion to an earlier mental phase. In October an acute exacerbation of the skin eruption followed a general sinus irrigation. The cervix was treated, and in November the tonsils were removed and the sinuses again washed out. By end of December the skin eruption had cleared up, patient had gained a stone, and showed interest in music. The permeability quotient was normal at 3·02. A second course of protein therapy and ultra-violet light was given in January. In February both antra were drained and ear discharge diminished. Definite physical and mental improvement followed, and she was discharged recovered in the summer—better than she had ever been.

This case, said Dr. Graves, showed the law of anticipation in heredity. He suggested that psychotic heredity might be made up of a number of components, in this instance possibly transmitted familial infection. The case also illustrated the serious effect of sinus disease on the reproductive function.

Dr. D. K. HENDERSON (Glasgow) said that Kopeloff and Kirby had divided 120 cases of mental disorder into two groups, one of which was treated surgically while the other was left alone. The percentage recovery-rates for manic depressives and cases of dementia præcox showed no advantage for surgical treatment. Dr. Hunter had judged from one case, which was an example of involutional agitated depression which should never have been sent to the chronic ward. The prognosis was good from the first, and the case had followed a normal course. The term "septic psychosis" was quite unnecessary, and it was dangerous to say that because something existed in a given mental case, then that something was the specific agent. Mental patients had been studied in connexion with the various branches of medicine and surgery for some years, but the recovery-rate had not been materially improved. Mental disorder was a much more complex matter than the discussion had shown. A fair amount of mental illness, indeed, followed the very therapeutic surgical measures which were advocated.

Dr. W. F. MENZIES (Staffordshire) said that the presence of sepsis in mental cases had long been recognised, but in perhaps 300 times as many cases sepsis existed without producing mental disorder. Thus as a causative agent it appeared to be only secondary. It had been shown that the normal and mentally disordered subjects reacted in much the same way to tests of basal metabolism, blood picture, blood-sugar, hepatic and renal efficiency, blood pressure, oxygen absorption, and sensitiveness of the thyroid, pituitary and adrenal glands. Signs of chronic intestinal toxæmia were the same in the sane as in the insane. Vaccines had proved very disappointing and erratic in their results. The problem of the offending organism cried out for team-work on a national scale. The toxic agent might be a product of bacterial katabolism or of the hydrolysis of amino-bodies in food; it exercised its effects as an irritant to the afferent visceral neurons and endocrines, and as a blood infection. There were many ill-known visceral reflex arcs from and to the whole splanchnic area, biologically developed for defence. Any increased splanchnic irritation, as in intestinal toxæmia, would enter the field of consciousness as one of the many vague expressions of "feeling ill"—e.g., headache, giddiness, nausea, and depression. The problem must be studied from the simplest forms of mental disorder, such as acute mania and simple melancholia, which were more nearly allied to primitive emotional phenomena than the complex mental states of paranoia, schizophrenia, epilepsy and obsession. The hopefulness of advanced phthisis and the depression and irritability of bacterial toxæmia were the analogues of mania and melancholia, and many other examples could be cited. They showed that there was normally a stream of reflex currents passing through the basal ganglia and brain-stem which, if amplified, were presented to consciousness as dysphoria provided that they could be freely corticalised. If, however, the connexions with higher centres were interrupted in any way, dysphoria could not arise. Rigidity, as in destructive lesions of the neothalamus or lentiform nucleus, was always associated with euphoria. Pathological euphoria was the expression of the increased blood-flow due to the irritation of a moderate amount of toxins circulating in the cerebral vessels. Perhaps increased permeability of the cerebral reticulo-endothelial system admitted toxins which confused the cortical association paths. Physicians and surgeons missed a great chance of helping psychiatrists when they omitted to describe their patients' emotional subjective tones.

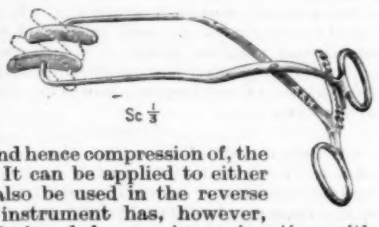
Mr. WATSON-WILLIAMS (Bristol) complained that otologists saw only selected mental cases who had ear trouble. Quite apart from mental hospital practice, however, the otologist saw many of the milder mental disturbances associated with infection in the nose and ear. It was always a problem to decide which neuroses were caused by the infection, and which cases were suitable for surgical treatment. It was almost possible to formulate so distinctive a clinical picture of the mental state which accompanied nasal accessory sinus disease, that this condition could be suspected when physical manifestations were lacking. The patient, when tactfully questioned, would confess lack of power to concentrate, a tendency to worry over trifles, and inability to make a decision. It was because patients could not decide to submit to operation that the surgeon had opportunities of seeing the stages of their mental degeneration. When mentality was restored abruptly by the removal of a septic focus it was impossible not to admit some causal connexion between the physical and mental states. Describing several cases, he remarked that it was the people without much pus who were most liable to mental disturbance.

Dr. W. A. POTTS (Birmingham) suggested an answer to the question why some victims of toxæmia developed mental symptoms and some did not. In those who manifested mental disorder the condition had generally been longer established, and more pathogenic factors were operating. Extraordinary results would be obtained if septic foci were treated early instead of after they had produced dangerous symptoms. The psychogenetic factor also called for prompt treatment, before the patient became inaccessible.

New Inventions.

TONSILLAR FOSSA PRESSURE FORCEPS.

THE instrument shown in the illustration is a modification of the Courtney-Yorke pattern, but differing in a few important details. It has curved instead of straight handles, and ends which are kidney-shaped and movable, to allow of more accurate adjustment to, and hence compression of, the tonsillar fossa. It can be applied to either tonsil and can also be used in the reverse position. The instrument has, however, been specially designed for use in conjunction with the hæmostatic tonsillar clamp, since it does not interfere when left in position on the one tonsillar fossa with the application of the hæmostatic clamp to the other tonsil and the subsequent dissection of the latter.



Messrs. Allen and Hanburys Ltd. are the manufacturers.

L. GRAHAM BROWN, M.D. Oxf., F.R.C.S. Eng.

ST. GEORGE'S HOSPITAL.—In spite of economy at this hospital the excess of expenditure over income last year was £9462, the cost of maintenance being nearly double what it was in 1913. Unless an additional sum of £20,000 a year can be assured the time must come when it will be necessary greatly to curtail the work undertaken.

PROPOSED BURNING OF AN OLD HOSPITAL.—During the outbreak of small-pox which occurred about 25 years ago the Edmonton Urban Council used a wooden building as an isolation hospital. Having no further use for the building, which comprises some 50 tons of material, the public health committee have advised that it should be burnt, rather than dismantled. If the wood were sold it might cause "an outbreak of small-pox or, at any rate, a public panic." The district medical officer's opinion is that there would be no risk of infection.

Reviews and Notices of Books.

OUTLINES OF DENTAL SCIENCE.

Vol. I. *Dental Anæsthesia.* By G. F. RAWDON SMITH, M.D., Lecturer on Dental Anæsthetics, University of Liverpool. Pp. 160.

Vol. II. *Dental Bacteriology.* By R. A. BRODERICK, M.B., L.D.S., Lecturer in Bacteriology to Dental Students, Birmingham University; Dental Surgeon to the Children's Hospital, Birmingham. Pp. 144.

Vol. III. *Dental Materia Medica.* By PROSPER H. MARSDEN, M.Sc., Ph.C., F.C.S., Lecturer in Materia Medica and Pharmacy, University of Liverpool. Pp. 155.

Vol. IV. *Dental Prosthetics.* By J. D. LOGAN, L.D.S., Lecturer on Dental Mechanics, Edinburgh Dental Hospital. Pp. 218.

Vol. V. *Dental Radiography.* By C. A. CLARK, L.D.S., Consulting Radiologist to the Royal Dental Hospital. Pp. 98. Edinburgh: E. and S. Livingstone. 1926. 7*s.* 6*d.* per volume.

THIS series of volumes when completed is intended to cover the whole range of dental science. Seven further volumes are promised, so that the series will eventually cover 12 volumes of about 150 pages each. This country has lagged so far behind others in the production of dental literature that any effort to provide a comprehensive account of dentistry deserves welcome. These volumes contain much that is of interest but are not all of equal merit.

The first volume, on *Dental Anæsthesia* by Dr. Rawdon Smith, is written with a genuine understanding of the needs of the dental student and practitioner by one who has had an extensive experience of dental anæsthetics. It is clearly written and covers the ground ably. The account of the administration of nitrous oxide is particularly good. The section on the administration of gas by the nasal method might have been fuller with advantage, since an increasing number of dentists give gas themselves by this nasal method. The statement that there are no bad after-effects is not always correct. The prolonged use of nasal gas, in the opinion of many anæsthetists, puts a severe strain on the right heart and many patients take a considerable time to recover. It is an extremely useful method but should not be abused by attempting to induce a lengthy anæsthesia which is more safely gained by ether, and a word of warning to this effect might have been included. Among the contra-indications of gas, affections of the thyroid gland should have found a place. We are glad to see that the author favours the use of ethyl chloride as an anæsthetic, especially for children. He states that an anæsthesia of from 60 to 70 seconds can be obtained. In our experience it is quite easy to get an anæsthesia of nearly two minutes in the case of children without running any risk of overdose. Ether, chloroform, and the various mixtures and sequences of anæsthetics are dealt with briefly but adequately. A chapter on local analgesia is included, presumably for the sake of completeness; it is doubtful, however, if this important branch of dental anæsthesia, which is entirely in the hands of dentists rather than anæsthetists, is appropriately treated in a book of this kind. The few pages devoted to local analgesia are of no value to the student and might have been omitted. It is stated that modern dentistry should be made painless, and the suggestion is made that cavity preparation can be carried out without pain by anæsthetising the pulp through a layer of healthy dentine by means of a special syringe. Practising dentists know, however, that this method has long been abandoned as useless, and, indeed, is a cause of pain. The last chapter on the medico-legal aspects of anæsthesia is a useful summary of the legal status of anæsthesia. While this book does not compete with the larger text-books devoted to anæsthetics in dental surgery, it is a useful and practical presentation of the subject which the dental practitioner should find helpful.

The volume on *Dental Bacteriology* by Mr. Broderick follows the usual lines. It contains a certain amount of abbreviated general bacteriology, the space being devoted specially to the flora of the mouth. From the examination point of view it may be useful, but we are sceptical whether the reader will gain from it any clear idea of what infection and immunity really signify. Toxins, immunity, opsonic index, vaccine treatment, and anaphylaxis are discussed in a chapter on bacterial products and results and cover just 16 pages. Even more inadequate are the two pages describing the Wassermann reaction.

Dental Materia Medica, by Mr. Marsden, is a useful compendium of drugs which have been or still are used in dentistry. The author might with advantage have devoted more space to discussion of the pharmacological action of drugs where the student really ought to know it. Many of the preparations described are practically obsolete or of doubtful value. Gelsemium as a remedy for neuralgia is mentioned and an appropriate prescription given. It is stated that untoward symptoms may arise, but no hints are given to enable the dental student to recognise them. In the chapter on hæmostatics the author states that ferric chloride is a "somewhat objectionable hæmostatic, as it is deleterious to the teeth and has a strongly acid reaction. It may be looked upon as a last resort." Modern teaching is that the use of ferric chloride to stop hæmorrhage after tooth extraction is quite unjustifiable. It causes severe sloughing and may lead to secondary hæmorrhage. In Conditt's (not Condett, as stated in the book) method of using silver in root canals the preparation used is not silver nitrate as stated, but an unstable compound of silver and ammonia from which metallic silver is readily precipitated by the use of a reducing agent. The method of its preparation might well have found a place. A useful drug not mentioned is chromic acid, which in 5 per cent. strength is widely used in the treatment of acute ulcerative gingivitis.

The volume on *Dental Prosthetics*, by Mr. Logan, is a practical manual of workshop mechanics. The author evidently has a daily familiarity with all that he describes. His standpoint is an individual one and not every practitioner will agree with all that he has to say. His book is stimulating and useful; it is longer than the other volumes of the series, yet even 200 pages is small compass for so large a subject. Some of the sections are too brief to be of much value, but on the whole Mr. Logan has performed his task with much skill and has written a really practical and useful manual.

The last volume of the series, on *Dental Radiography*, is the shortest and one of the best. Mr. Clark was the pioneer of dental radiography in this country and its evolution to a high state of efficiency owes much to his skill and enthusiasm. He has produced an excellent book which should find a wide welcome. An increasing number of dentists take their own radiograms, and though they can hardly hope to equal the technical excellence of such an expert as Mr. Clark, there is no reason why they should not produce photographs adequate for most purposes. It is highly desirable that every dentist using an X ray apparatus should have a working knowledge of electricity, for it is foolish to use such a powerful agent without knowing its possible dangers. Those who read this book carefully will learn much from it. The account of the installation, care, and uses of a radiographic apparatus is clear, concise, and practical. This is certainly the best book of the series. A special word of praise should, we think, be given to the reproductions of radiograms. They are among the best we have ever seen and reflect much credit on both the radiologist and the publishers.

THE OPERATIONS OF SURGERY.

Seventh edition. By R. P. ROWLANDS, O.B.E., M.S., F.R.C.S., Surgeon to Guy's Hospital, Lecturer on Surgery to the Medical School; and PHILIP TURNER, B.Sc., M.S., F.R.C.S., Surgeon to Guy's Hospital, Lecturer on Surgery to the Medical School. London: J. and A. Churchill. 1927. Vol. I., pp. 1046; Vol. II., pp. 896. £3 10*s.* each volume.

THIS book has long been established as a reliable guide to the operating surgeon, representing the best in current thought and practice. The seventh edition has been thoroughly revised and brought up to date. The operations described are for the most part those performed by the authors, both surgeons of large and illuminating experience, so that their remarks carry weight, and the descriptions of the difficulties which may be encountered and how they may be overcome are particularly helpful and practical. Here and there only are departures from generally accepted teaching, or small omissions. In the account of operations for empyema the reader will not find precise instructions how to deal with an interlobar collection of pus; in the decortication of lung operation the shock observed when the rigidly attached lung is suddenly freed is not emphasised. We cannot agree with the statement on page 792 of Vol. I. that it is difficult to obtain perfect analgesia by local methods for resection of ribs. As a rule, local anæsthesia can be brought about easily and effectively for these cases. In operations for necrosis of the long bones, an account of how to deal with those cavities at the upper end of the tibia, for instance, close to the articular cartilage would have been appreciated. Arthroplasty of the hip is scarcely more than mentioned, but the mature judgment of the authors may well regard it as an operation very rarely indicated. Whitman's operation for ununited fracture of the neck of the femur does not appear, though it is probably the best for this condition. It is interesting to note that the treatment for hallux valgus which the authors regard as giving the best results is not that usually performed.

In Vol. II. there is very little that calls for comment. It is full of good advice resulting from the mature judgment of experience and worthily maintains the tradition handed down by the original authors. The descriptions given of many rather unusual operations, such as that for ectopia vesicæ or the removal of a lingual goitre, will be particularly helpful when the occasions arise. We have not found an account of the useful extra-peritoneal approach to the lower ends of the ureters through a median incision, but this is one of very few omissions.

"Rowlands and Turner" is likely to keep its place as a popular guide for the novitiate surgeon, for whom, with its interesting accounts of actual cases, it is particularly adapted. Very seldom will he consult its pages without finding the very information and guidance that he seeks.

THE METHODS OF CLINICAL DIAGNOSIS.

By ALEXANDER GEORGE GIBSON, M.D., F.R.C.P., Honorary Physician to the Radcliffe Infirmary; and WILLIAM TREGONWELL COLLIER, M.D., M.R.C.P., Honorary Assistant Physician to the Radcliffe Infirmary. Illustrated. London: Edward Arnold and Co. 1927. Pp. 398. 12*s.* 6*d.*

THOUGH assisted more and more every year by scientific methods, diagnosis still remains to a very large extent an art. It is therefore a difficult subject to teach adequately in a book which can at the most indicate the main lines. This new volume does succeed in getting down to fundamentals, and in putting before the reader "the technique of examination, of what to look for and how to look for it." A good survey of the different regions of the body to be examined is followed by a more detailed description of the various systems, wherein sections on the interpretation of symptoms and physical signs are elucidated by a summary of the conditions found in certain diseases of each system. The student is encouraged to make inferences from the moment of his first glance at the patient, amplifying or modifying these as the history of the condition becomes clear and the physical examination proceeds. The section of the book devoted to the cardiovascular system is especially good; a short summary of the "criteria of a healthy heart" is a wise inclusion. It is satisfactory at last to find in print the statement (p. 83) "percussion is not an entirely reliable method for estimating the size of the heart." The section on the nervous system is very full, but seems a little out of proportion to the rest of the book, occupying as it does over 80 pages of the total. This section is also more difficult to follow, even allowing for the complexity of the subject. A small point calls for comment in connexion with the examination of the abdomen. On p. 63 the student is advised to press "deeply under the ribs" when feeling for the spleen. A soft, diffusely enlarged spleen may not be felt if too much pressure is used. It is generally better to let the spleen come down and touch the examiner's hand during inspiration than to press deeply. The book concludes with a well-chosen section on clinical pathology and an appendix containing useful tables.

THE HEART AND ITS DISEASES.

By CHARLES W. CHAPMAN, M.D., M.R.C.P. Edinburgh: E. and S. Livingstone. 1927. Pp. 216. 8*s.* 6*d.*

THE aim of this book is to provide for the busy practitioner a brief summary of the current teaching in cardiology. Its general arrangement follows the accustomed scheme. The opening chapters deal with the anatomy of the heart and its conducting tissues, and with symptoms and physical signs. Rheumatic, syphilitic and other types of heart disease are briefly reviewed, and special chapters are devoted to the consideration of marriage and anæsthesia in cardiac patients. Many similar small books on the heart have been published in recent years, and the present volume does not present any features likely to render it more popular than its predecessors. The illustrations, most of which are taken either from Cowan and Ritchie's or from Price's works, are good, but the text leaves much to be desired. For example: "In auricular disease characterised by marked dilatation and a state of over-excitability, incomplete attempts to contract the auricle (auricular fibrillation) occur." Such statements fail entirely to give a true picture of the condition described, and can only lead to confusion in the mind of the reader. One great fault in this as in many other small books is that the author attempts to deal with detail instead of being content with setting out general principles.

THE INVERT.

By ANOMALY. London: Baillière, Tindall and Cox. 1927. Pp. 160. 5*s.*

THIS little book brings forward for consideration, with a frankness that deserves a return, certain phases in the question of homosexuality because their explanation will be of real use to those who find themselves at a loss to provide practical advice for patients and penitents of confused sex—cases in which the coöperation of the doctor and the priest is often needed. An introduction by Dr. Thouless, Ph.D., lecturer in psychology at the University of Glasgow, should be read, as it clears the author's way excellently, and justifies the writing of the book on practical grounds. There is no reason to desire the continuance of an ignorance of the problems of inversion which precludes their receiving either instructed or charitable deliberation. A mean is possible between popular conversation—and no one wishes to see the subject debated in drawing-rooms—and the gutter publicity which such topics receive to-day; such a mean the author has succeeded in maintaining, and his counsel is given with real literary accomplishment.

MANUAL OF BACTERIOLOGY.

Eighth edition. By ROBERT MUIR, M.A., M.D., Sc.D., LL.D., F.R.S., Professor of Pathology, University of Glasgow; and the late JAMES RITCHIE, M.A., M.D., F.R.C.P. Edin., late Professor of Bacteriology, University of Edinburgh. Revised with the coöperation of CARL H. BROWNING, M.D., D.P.H., Professor of Bacteriology, University of Glasgow; and THOMAS J. MACKIE, M.D., D.P.H., Irvine Professor of Bacteriology, University of Edinburgh. London: Humphrey Milford, Oxford University Press. 1927. Pp. 821. 16s.

IT comes as something of a shock to realise that "Muir and Ritchie" with the appearance of the eighth edition celebrates its thirtieth birthday. With sadness we note that for the first time the hand of James Ritchie, who so long and so worthily shared the responsibility for its production, has played no active part in the preparation of the current volume. Prof. Muir has done well in his endeavour to fill the gap, by enlisting the coöperation of Prof. Browning and Prof. Mackie, so that as the book now stands it is wholly the product of the Glasgow school. There is one at least small but notable improvement on former editions. Throughout the period covered by our recollection the opening phrase of the first chapter of Muir and Ritchie has been "At the bottom of the scale of living things . . ." and we remember the dismal impression conveyed by this phrase and by the rest of the introductory chapter, of the awful dullness of bacteriology. Only active contact with the subject served to dispel that impression. The book has, indeed, been revolutionised by the disappearance of this initiation; the introductory chapter has been rewritten and has gained much thereby. Throughout the book, indeed, the revision has been adequate, while the size has not obviously increased. Some of the half-tone blocks show signs of wear, and the coloured illustrations are disadvantageously collected together at the beginning of the volume. Its price is worthy of note by the student, as comparing favourably with that of many American text-books.

"Muir and Ritchie" is what it has always been, sound, well-balanced, up to date, and a safe and accurate source of reference.

MONGOLISM.

Beitrage zur Kenntnis der Mongoloiden Missbildung. By Dr. W. M. VAN DER SCHEER. Berlin: S. Karger. 1927. Pp. 162. M.12.

Dr. van der Scheer's comprehensive monograph is based on a study of 348 cases of mongolian idiocy seen by him during his four years' tenure of an inspectorship of asylums in Holland. He deals first with the various theories that have been advanced to explain the occurrence of this abnormality. G. Shuttleworth's view is that the mongolian idiot is an exhaustion product and occurs as a result of conditions adversely affecting the maternal reproductive organs —e.g., advanced age, frequent childbearing, toxic influences, nervous depression, and alcoholism. Syphilis or tuberculosis may be contributory factors, but are not specific causes of mongolism. F. G. Crookshank, on the other hand, in a recent work takes the view that mongolism is an atavistic return to a more primitive type. As a result of a study of his series of cases, Dr. van der Scheer comes to the conclusion that the above views are incompatible with the facts observed by him. Comparing the histories of 79 mongols with 76 non-mongolian idiots, he finds that no greater importance can be attached to the state of the mother's general health when a mongol is produced than when the child exhibits any other form of weakmindedness. The main facts which emerge from his investigation are as follows: Very many mongols are the last born; many mothers of mongols are of advanced age at the time of birth of the mongol; in families with mongols, abortions and stillbirths are frequent; blood relationship of parents is of no importance; hereditary factors are of little importance; the father's age is of no importance. In 56 per cent. of Dr. van der Scheer's cases the mongol was the last born, and in 45 per cent. the mother's age was greater than 40 years; he confesses himself forced to the view that there exists a factor inhibiting normal childbirth, that this factor is as specific as the condition; he regards it as more likely to exist in the uterus than in the ovary. A very full account of the post-mortem appearances of a number of cases of mongolism is included. In the brain there is often found a hypoplasia of the infundibular region and hypophysis, the floor of the third ventricle and the interpeduncular region. In many cases mal-developments or absence of the ossa nasalis have also been observed. Dr. van der Scheer suggests that in these cases there is probably a developmental defect in the median plane of the skull, and he advances the theory that at a certain stage in embryonic development a too small amniotic sac prevents the normal extension of the fœtus. The head is thus compressed against the chest, and for a time the fœtus remains too strongly flexed. This theory would bring mongolism into line with other abnormalities of mechanical origin. The various findings which Dr. van der Scheer considers support this view are discussed in great detail in the text, which is well illustrated. An extensive bibliography of the literature of mongolism completes the monograph.

THE CARE OF THE FACE.

By OSCAR L. LEVIN, M.D., Chief of the Dermatological Clinic, Cornell University. London: William Heinemann, Ltd. 1927. Pp. 225. 6s.

IF the author's sources of information are reliable, no less than £29,000,000 are annually dissipated in America on "skin foods," "face-moulders," "unwrinklers," and a heterogeneous variety of cosmetic procedures. While we cannot compete with such stupendous figures in this country, evidence of the general prevalence of the cosmetic habit is not lacking, and it will be recalled that in a recent legal process it was stated that the institute concerned earned an average income of £600 per week. Dr. Levin's attempt to educate and rescue the willing victims of cosmetic chicanery is commendable. He has a wide knowledge of pathology and a racy style, usually absent in medical treatises, and if the ordinary layman can be prevailed upon to read it, particularly the lay woman, real good should follow. For the author has managed to compress an enormous amount of valuable information and what the average individual understands by "horse sense" into his book. There is an excellent chapter on quackery, in which the dangers of X rays for hypertrichosis, the evils of hair-dyes and depilatories, plastic surgery, paraffin injections, and a number of other cosmetic procedures and preparations are ably discussed and criticised. Hypertrichosis is again dealt with in another chapter, and again the treatment by X rays is condemned, and it is to such blemishes of presentation that the difficulty of reading the book is due. This duplication of material is a characteristic feature throughout and there is very little attempt at orderly arrangement, so that the impression is gathered that a number of lectures have been very roughly recast and thrown together without regard to sequence or classification. Even a medical man may find it difficult to thread his way through the tortuous channels of fact, theory, and invective, doubtless justified, with which the author has coloured his pages, and laymen will be more sorely tried. The type in the text is all of one size, little use is made of subheadings, and there is no index, its place being taken by a short glossary. The line drawings that illustrate points in the text might as well have been omitted; in a word, the format has not done much to lighten the author's very difficult task.

MOTHER INDIA.

By KATHARINE MAYO. London: Jonathan Cape. 1927. Pp. 391. 10s. 6d.

IN the first chapter the authoress, an American woman, states her object in writing this book.

"Leaving untouched the realms of religion, of politics, and of the arts," she writes, "I would confine my inquiry to such workaday ground as public health and its contributory factors. I would try to determine, for example, what situation would confront a public health official charged with the duty of stopping an epidemic of cholera or plague; what elements would work for or against a campaign against hookworm; or what forces would help or hinder a Government effort to lower infant mortality, to better living conditions, or to raise educational levels, supposing such work to be required."

The storm of controversy that has been raised by this book, and the diversity of the comments that have been passed upon it by critics of wide experience, bear testimony to the striking quality of the evidence which is presented and of the conclusions which are reached. There is here told a story of a struggle against forces of inertia and superstition which, by incurious residents in India, are only dimly apprehended. It is a story which it is impossible even to epitomise in this review. Suffice it that the account of the child-marriages, the obstetric practices, and the sanitary habits imposed by Hindu religion make it difficult to understand how more than a minority of women survive childbirth. And the treatment of animals which it sanctions is such as to harrow the medical no less than the lay reader. Miss Mayo imports into her style qualities of descriptive vividness, of irony, and of literary restraint which are well offset by the invariable documentary support which she gives to her statements. Her sojourn in India being short compared with that of many Englishwomen, she writes her book in the light of the recorded experiences of others no less than in that of her own experiences. Her statements are abundantly substantiated by references to written sources—to Government reports, to speeches made by Indians in Council or Legislative Assembly debates, to Mr. Gandhi's writings, to Indian medical journals and reports, and to numerous books written by Englishmen with long experience of India. Far from representing a superficial impression formed during a hasty tour, the book is based on a vast deal of reading, and covers a period which ends with the last months of 1926.

It is difficult to exaggerate the interest of this book. Medical interests are interwoven with ethnological, psychological, and historical material in a whole which is presented in language so well chosen as to make the book a masterpiece of descriptive writing. And it should bring especial pleasure to English readers. What has been said by Miss Mayo, an American woman viewing our administration from the outside, could never possibly have been said by an English author without incurring the charge of self-interested partiality. For throughout the book, implied on almost every page though never in so many words expressed, is to be found a tribute to our rule in India for which, in sincerity and tacit eloquence, it would be difficult anywhere to find an equal.

VENEREAL DISEASE.

Its Prevention, Symptoms, and Treatment. Third edition. By H. WANSEY BAYLY, *M.C.*, M.R.C.S., L.R.C.P., Hon. Secretary, Society for Prevention of Venereal Diseases; Medical Officer in Charge, V.D. Department, St. George's Hospital. London: Faber and Gwyer. 1927. Pp. 242. 10s. 6d.

Mr. Bayly's book in its third edition is divided into five sections; the first section, as might be expected from the author, is on the prevention of venereal disease. It is a robust statement of the possibilities and the efficacy of immediate self-disinfection in men. The second section on syphilis is good, and includes some useful pictures of sores and rashes. In this part of the book the requisite pathological tests are fully described. Mr. Bayly gives a "combined routine treatment course" for syphilis, occupying 106 days, modified for different individuals, which seems adequate. The treatment prescribed is both sound and modern. Gonorrhœa is fully dealt with in the third section, which contains no particularly new features. Some minor horrors frequently associated with venereal disease are discussed in the fourth section, and the fifth is devoted to description of arrangement of consulting-room and to case-taking, as well as to the more important questions of sterility, impotence, neurasthenia, and the problem of how soon after infection a man should be allowed to marry. On the last matter we wish to join issue with the author; in our opinion, even with expert modern treatment, a year from the date of infection with syphilis is too soon to allow a man to marry; the proviso that the man continue treatment after marriage may well be thought unnecessary by the patient, and the possibility of infecting a wife or child is one not lightly to be dismissed. Three coloured plates and 74 illustrations adorn the text, and the book as a whole can be recommended.

BACTERIAL VACCINES.

Their Position in Therapeutics. By LEONARD S. DUDGEON, C.M.G., C.B.E., F.R.C.P. Lond., Professor of Pathology, University of London, and Director of Pathology, St. Thomas's Hospital. London: Constable and Company. 1927. Pp. 87. 7s. 6d.

THIS is a short monograph based upon the wide personal experience of its author. Prof. Dudgeon expresses himself tersely and dogmatically; the fact that he writes of his own experience and views and presents these without much reference to the work of others makes for easy reading. The subject is set out in a sane and balanced manner and without any suggestion of misleading enthusiasms. Prof. Dudgeon acts the part of judge rather than advocate, and for this all interested in vaccine therapy should be grateful. There is not much in the book which calls for critical comment. We note that the author kills his vaccines by formalin; that he has found no superiority in sensitised vaccines; that he standardises his vaccines by an opacity method; that he has no doubts as to the superiority of the autogenous variety; and that he pronounces definitely against this form of therapeusis in acute infections. All of this is sound doctrine, and it is pleasant to find it clearly and authoritatively stated. Non-specific protein therapy, in common with all varieties of vaccine treatment which are irrational, such as haphazard streptococcal vaccine administration in pernicious anæmia, goitre, "intestinal toxæmia," and so forth, is roundly denounced. As a guide to what bacterial vaccines and allied substances are, when they are useful and when they are to be avoided, this little book is the best we have encountered.

TOPOGRAPHY OF THE SKELETON OF THE LARYNX.

Die Topographie des Kehlkopfgerüstes. By Dr. W. MINNIGERODE, Assistant Surgeon in the Second University Clinic for Throat, Nose, and Ear Diseases in Berlin. Munich: J. F. Bergmann. 1927. Pp. 25 + 17 plates of illustrations. M.18.

IN this anatomical study, for which he has utilised drawings left by the late Gustav Killian, Dr. Minnigerode has produced a useful and readable account of the relations of the framework of the larynx, the hyoid bone and laryngeal cartilages to the soft structures of the larynx, and especially to these parts seen in the laryngeal mirror. He has made use of dissections, frozen sections, and, in a few instances, of radiograms, and has provided an interesting text to accompany the 68 excellent drawings. The most practically useful are those on Plate XVI., which gives five drawings of the larynx as seen in the mirror, with the several cartilages distinguished by shading. A careful and thorough piece of work.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 17, 1927.

THE TREATMENT OF EPILEPSY.

ADVANCES in the treatment of epilepsy have recently been made in three directions. Empirical modifications in the metabolism of epileptics have been found to possess therapeutic value. The introduction of luminal and its sodium salt has provided a new pharmacological weapon, a discovery which has been contemporary with considerable additions to our knowledge of the mode of action of sedative drugs upon the nervous system. Lastly, an increasing recognition of the importance of a psychological approach to the problem of epilepsy, although perhaps this has been exaggerated in some quarters, has had a beneficial effect upon treatment. Recent attempts to treat epileptics by altering their metabolism date from 1921 when GEYELIN introduced fasting as a therapeutic measure. It was found that complete starvation for 10 or 12 days produced a marked improvement in the condition of epileptic patients. Acting on the assumption that the beneficial element in the starvation was the associated ketonæmia, WILDER, PETERMAN, and others attempted to obtain the same result by administering a diet sufficiently rich in fats and poor in carbohydrates to produce a marked ketosis. Such a ketogenic diet was found to be as efficacious as complete starvation, and has now been used widely enough for certain conclusions to be drawn as to its value. All available data are derived from the treatment of children only. The diet must be accurately planned to produce ketosis and at the same time to supply the needs of a growing child.[1 2] It has been found that unless the ratio of ketogenic to antiketogenic foods—that is, of fats to carbohydrates and proteins—exceeds 1·5 to 1·0 by weight, ketosis does not develop. The ratio required to effect improvement may be as high as 5 to 1, and a 3 to 1 ratio has in many cases been maintained for months. This involves both a great restriction of sugar and an unpalatably large consumption of fat, and thus the same difficulties are encountered as in the dietetic treatment of diabetes in children; an outbreak of fits in a child that was previously responding well to the treatment can usually be traced to clandestine sweet-eating. Different observers report a very similar proportion of cases benefited. TALBOT, METCALF, and MORIARTY state that 30 per cent. of the children treated became free from attacks, whilst HELMHOLZ reports a cessation of fits in 31 per cent., and states that 23 per cent. were improved to a less extent and 46 per cent. were unaffected. Since the children freed from attacks have been under observation for not more than two or three years, it is impossible to say whether the improvement is permanent, and a ketogenic diet cannot at present be regarded as in any sense a cure for epilepsy. It seems, however, to be worth a trial in selected cases where the coöperation of intelligent parents can be obtained, and especially when the child has failed to respond to treatment with the bromides and luminal.

The fact that a ketogenic diet benefits even a proportion of epileptics raises questions of great theoretical interest. It has not been proved that the therapeutic value of starvation and a diet rich in fats is due to the associated ketosis, and another explanation is suggested by recent investigations, which appear to have established the existence of a definite metabolic abnormality in epileptics. POPÉA and VICOL in 1925 noted in a small number of epileptic patients that the level of the blood cholesterol was abnormally low, and regarded this as a result of the convulsions. Dr. S. H. G. ROBINSON, Dr. RUSSELL BRAIN, and Dr. H. D. KAY, in a recent issue of THE LANCET,[3] published the results of their investigation of the blood cholesterol in over 100 epileptics and a similar number of controls. These workers confirmed the association of a low blood cholesterol with epilepsy and were able to show that the fall in the blood cholesterol was not the result of the fits, since it began some hours before a convulsion, which took place at or about the time when the level of cholesterol in the blood was lowest. KILLIAN and OSNATO have also observed a low blood cholesterol in epileptics, so that this phenomenon has now been noted by three independent groups of workers. Its significance, however, has still to be discovered, and is likely to remain obscure until there has been a considerable advance in our knowledge both of the physiology of cholesterol and of the metabolism of nervous tissue. ROBINSON, BRAIN, and KAY point out that cholesterol is an important constituent of nerve-cells and that the association of a low blood cholesterol with epilepsy receives support from clinical experience; for the level of this blood constituent is low at the menstrual period when convulsions are specially prone to occur in epileptic women, and an abnormally high blood cholesterol is found during starvation and in patients receiving a diet rich in fats. Here, perhaps, is an indication of the direction in which we should look for a possible rational basis for the therapeutic value of starvation and a ketogenic diet.

Dr. TYLOR FOX'S article on the use of luminal-sodium in the treatment of epilepsy, which we publish in this issue, should prove of practical value to all who have to treat epileptics, and also raises points of great interest to investigators. His results clearly demonstrate that epileptics acquire tolerance to the drug and that its withdrawal is followed by an increase in the number of fits, so that the patient may be actually worse than before treatment. These facts emphasise the need for caution in the use of luminal, and support the practice of keeping it in reserve until the bromides have been tried and found wanting. Dr. FOX found that in the majority of cases the mental state of his patients was greatly improved as a result of the reduction in the number of their fits which luminal effected. In a few cases, however, the patients became more asocial and violent than before, and administration of the drug had to be stopped. How are these diverse results to be explained? Some light is thrown upon this problem by recent advances in the pharmacology of sedative drugs. We are not here discussing in detail the possible causes of epilepsy, but it may be said that the most useful hypothesis as to the nature of the physiological disturbance in a convulsion is that it is a sudden and explosive discharge of neural energy. PAVLOV has shown that the pharmacological effect of the bromides is to strengthen the inhibitory processes of the cerebral cortex, and

[1] Talbot, F. B., Metcalf, K. M., and Moriarty, M. E.: Boston Med. and Surg. Jour., 1927, cxcvi., 89.
[2] Idem, Amer. Jour. Dis. Child., 1927, xxxiii., 218.
[3] Robinson, S. H. G., Brain, W. R., and Kay, H. D.: THE LANCET, August 13th, p. 325.

PICK has demonstrated that luminal acts in the same way. Both these drugs, therefore, produce by physico-chemical means a state of the cortical neurons which is the very reverse of activity or discharge, and this is presumably the source of their therapeutic value in epilepsy. The treated epileptic is saved from the usurious drain of his fits upon the energy of his nervous system, and can spend his neural income on higher activities whose nature depends upon his natural disposition. Dr. FOX points out that those patients whose character deteriorated as their fits diminished had a previous history of asocial behaviour. PAVLOV'S researches illuminate also the part which psychological factors may play in the precipitation of epileptic attacks; he was able to produce the symptoms of neurasthenia in dogs by overstraining their capacity for inhibition of conditioned reflexes. Such experiments suggest that in a potential epileptic a neurosis which taxes the patient's inhibitory powers may facilitate the epileptic discharge. Hence, psychological understanding plays a necessary part in the treatment of epilepsy. The patient must be saved from any avoidable mental stresses which may be associated with his domestic environment, and he must, if possible, be provided with a quiet occupation which calls for canalised and orderly neural processes. This in itself involves no small degree of training in inhibition, and in selected cases active psychotherapy has undoubted value. We have discussed pharmacological, metabolic, and psychological modes of treating epileptics; he will be the most successful therapist who realises that these methods are not mutually exclusive. Neither research nor treatment is likely to be useful if it does not envisage man as approachable on different levels of reality, and as being at the same time a collection of molecules, an integration of physiological processes, and a mind.

SLAUGHTERING AND SLAUGHTER-HOUSES.

Captain C. W. HUME'S interesting address to the Section of Agriculture of the British Association at Leeds will focus attention once more on the conditions of slaughter prevailing in this country. As he points out, the three criteria by which the present system of slaughtering must be judged are humanitarian, hygienic, and commercial. While any modification of slaughter-house construction or procedure may affect all three aspects of the question, it is particularly in relation to hygiene that medical opinion has a right to be heard. In this respect we must reluctantly admit that Captain HUME'S indictment of slaughtering conditions in this country is justified. With rare exceptions our principal towns have failed to provide public abattoirs which meet the requirements of modern hygiene, either as regards construction or facilities for meat inspection. It is the case, as Captain HUME says, that a large proportion of all the animals slaughtered is still dealt with in about 20,000 private slaughter-houses, most of which are primitive in construction, and afford no proper facilities for detection of disease either in living animals or their carcasses. The methods of handling the carcasses also leave much to be desired. Outbreaks of food poisoning, not infrequently traced to meat which has been free from the manifestations of disease on inspection, may quite well be due to contamination with intestinal contents, for carcasses are constantly exposed to this risk during the process of dressing. It may be, as Captain HUME suggests, that the blame rests principally with the National Federation of Meat Traders' Associations, but local authorities are not entirely guiltless. Even in areas where power has been obtained, ostensibly on public health grounds, to provide public abattoirs and prohibit private slaughtering, control has been placed in the hands of committees whose main object has too often come to be the reconciliation of traders' interests with public profit, rather than the protection of the community from disease. In most of our large public slaughter-houses the staff appointed for the purpose of veterinary and meat inspection is incomparably inferior in numbers to that of continental abattoirs, and the accommodation for those who are engaged in this work is not conducive to its proper accomplishment.

Captain HUME'S main thesis, however, is concerned with the practice of slaughtering. Here, it should be clearly understood, the prime consideration is humanitarian. The hygienist is drawn into the controversy only indirectly to support or refute subsidiary arguments brought forward by the protagonists of one or other point of view. It is possible that the keeping quality of meat is slightly affected by any additional excitement which animals may experience at the sight of blood, over and above the inevitable agitation attendant upon their being driven within enclosed spaces by strange hands. This effect must be accentuated if a method of killing is used which is uncertain, and may involve repeated violence before the animal becomes unconscious. It is likely, however, that the keeping quality of meat is also lessened by methods such as the pole-axe or the humane-killer, which delay bleeding and thus cause retention of a certain amount of blood and lymph in the muscular tissue. It appears, therefore, that there is need, from the hygienic standpoint, of a method which will entail the least excitement of the animals prior to slaughter, and will yet permit of prompt and complete bleeding. None of the supporters of the humane-killer has satisfactorily answered the arguments, based on scientific observation and experiment, which Dr. LEONARD HILL put forward in our columns in 1923[1] in support of the Jewish system of slaughtering. This method requires, however, great skill and the maintenance of instruments in a perfect condition. As now practised, it also involves the violent preliminary of "casting" large animals, though a much less brutal method of getting them into position, devised by Mr. WEINBERG, of Manchester, is now on trial.

It is an undoubted fact that animals suffer needlessly at the hands of apprentice slaughterers, whether they practise with the knife, the pole-axe, or the humane-killer, more especially with the two first-mentioned implements; but in skilled hands none of them need cause suffering to anyone but the sympathetic onlooker. The mere act of killing, irrespective of method, is so repulsive to many of us that we should follow the road to vegetarianism travelled by THOREAU if we set out, as he did, to provide ourselves with food by our own unaided efforts, and it is significant that not a few of the advocates of the humane-killer are vegetarians. If the division of labour which is a part of civilisation enables the rest of us to evade this issue, it does not relieve us of the responsibility of ensuring that our food is procured without cruelty. The use of the humane-killer may not be the ideal method of slaughter, but the agitation on its behalf will have been worth while even if it only leads to greater humanity in the application of the older methods.

[1] THE LANCET, 1923, ii., 1382.

PERIODICAL MEDICAL EXAMINATIONS.

WE have received from the People's League of Health a detailed account of the deputation to the Minister of Health on June 28th last, with a list of those figuring on the deputation, proving its representative character. The deputation submitted a group of resolutions through Lord BURNHAM, under which the Government was asked to consider the effect of unemployment and unemployment insurance benefit on the health and habits of the nation, both from the psychological and physiological aspects; and the necessity for new regulations to prevent waste and shortage of perishable foods during the summer by the establishment of adequate cold storage. But the main object of the deputation was to impress upon the Minister of Health the need for instituting periodical medical and dental examinations for all persons benefiting under the National Insurance Acts. The proposal of the League was that every insured person, when accepted as a panel patient, should be medically examined by his doctor and the result recorded; such an examination applying also to dentistry when this additional benefit is available under the Acts in question. The representatives of the League anticipated the obvious criticism of this proposition by pointing out that it was an economical one, having regard to the results that would be obtained in productive efficiency. The deputation was introduced by Lord BURNHAM, who confined his remarks to the consideration of periodical medical and dental examinations, and asked, in the name of the League, that a departmental or inter-departmental committee should be appointed to consider the question. The speakers who followed included Colonel F. E. FREMANTLE, Prof. P. LELEAN, Sir ROBERT ARMSTRONG-JONES, Mr. LAMING EVANS, Prof. WINIFRED CULLIS, Dr. WILLIAM HUNTER, Mr. E. B. TURNER, Dr. C. S. MYERS, Mr. R. C. JEWESBURY, Mr. LEWIN PAYNE, Mr. R. LINDSAY, Dr. OTTO MAY, Dr. R. J. LLEWELLYN, Mr. C. J. BOND, and Dr. W. A. POTTS, and all, out of practical experience in varied departments of medicine, surgery, psychology, dentistry, and health administration, brought arguments to show that the absence of early treatment of pathological conditions was the common factor in maintaining the incidence of disease in the country.

In our correspondence columns this week will be found a letter from a group of doctors, which goes over ground that is in some ways the same. The signatories to the letter—the Advisory Committee of the Regular Medical Examination Association—plead with the insurance companies or any other organisation to improve the relations between individual citizens and the medical profession by facilitating a scheme for the regular medical examination of families. The Association is in touch with a scheme emanating from a body entitled the Family Medical Services Ltd., which is instituting an insurance policy to cover the financial risks incurred by families in respect of medical service, this being described as the one item of family expenditure which owing to its uncertainty cannot be satisfactorily provided for in any way save by an insurance scheme. The policy proposes to meet the financial embarrassment of heavy doctors' bills, and not to pay for occasional medical attendances in the case of minor complaints. The scales of premiums and benefits can be obtained from 20, York-street, Manchester, these being graded in accordance with whether it is intended to insure against the charges of general practitioners only or against the cost of operations, in which case there are, of course, additional charges. The promoters of the combined schemes, it will be seen, while not insisting like the People's League of Health in regarding periodical medical examinations as the surest way of promoting individual health, are advocating for private patients much the same preventive means as the League desires for panel patients. It may be that medical examination can be dispensed with in taking out a doctors' bills policy—such seems to be the intention; but if the scheme should meet with supporters, the result will be the calling for medical attention in many circumstances where this is not done. Only experience can say if this indirect method of detecting early disease can be put upon sound financial grounds, the added professional work being adequately remunerated.

Mr. CHAMBERLAIN, in reply to the People's League of Health, was unable to do more than express a benevolent wish that the ideals of the League might be successful. He was unable to consider the advisability of making periodical health examinations compulsory or of grafting such examinations, with any voluntary basis, on to the National Insurance Acts. Nor was he prepared to set up a committee to consider the whole matter, holding that the machinery would be too expensive, while incidentally he touched upon other difficulties which would confront those framing any legal measures to carry out the proposals of the League. The massed figures, as used by various speakers on the deputation and by the Minister of Health, followed the familiar pattern—that is to say, it was shown that if so many men lost so many hours a day through invalidism, the aggregate loss to the country was colossal; and it was also shown that the examinations of so many patients on so many occasions over such and such periods would take up a colossal amount of time. On both sides the arithmetic has remained unchallenged, and displayed the difficulty of the issues. The view of the Minister clearly was that the cost to the country of periodical examinations was, at the present time, too great to be contemplated, while he may be inferred to have held that the economical gain following upon higher standards of general health could not be made a certainty unless compulsory examinations were instituted. This measure he thought would be impossible for adults, though feasible and successful in the early years of life.

UNIVERSITY OF LEEDS.—Sir Edward Allen Brotherton, of Leeds, has given £100,000 to the University for the provision of a Brotherton library.

LONDON MEDICAL EXHIBITION.—At the Central Hall, Westminster, daily, from Monday, Oct. 3rd, till Friday, Oct. 7th, between the hours of noon and 6.30 P.M., the London Medical Exhibition will be open to members of the medical profession. This annual display of the latest adaptations of research to medical and surgical treatment is always attended by a large proportion of medical practitioners both from at home and abroad, and this year there are indications that the exhibition will be the largest which has been held since 1905, the year of inception. Every effort is to be made to minister to the convenience of those who visit the exhibition, and a spacious tea room and a reception room have been provided. Those who have not yet received their cards of admission can obtain them on application to the Secretary, London Medical Exhibition, 194–200, Bishopsgate, London, E.C., or at the Central Hall during the exhibition week.

Annotations.

"Ne quid nimis."

THE LANGUAGE OF SCIENCE.

THE recent meeting of the British Association at Leeds has once again been the occasion for various complaints in the lay press about the obscurity of the language used by scientific men when they expound the results of their thoughts, observations, and experiments. It is perhaps natural that those who have to make the path straight for the public should lay stress on the efficacy of words, but, plainly enough, human thought is always a little in advance of human language, and any thought which is progressive must constantly be devising new words and reorganising and rearranging those already available. It would perhaps be better if old words were left alone; a good many difficulties arise from attempts to delimit and define words in common use for some special technical purpose. Such has, however, been the usual practice, and brand-new words, such as "gas" are exceedingly rare; scientific terminology has evolved and not been specially created. However, whatever its origin, it is, of course, unintelligible to an untrained audience. Such must needs be, for it is a shorthand so indispensable that within each scientific topic the intimates have generally developed a kind of super-shorthand, which is not always easy to distinguish from slang. It is hardly possible to contemplate doing without "anaphylaxis"; the professor of English literature in the University of Cambridge has a particular abhorence of "antibody"; what would he say of "immune serum" if he knew about it? In the great majority of instances there is no difficulty in making scientific work intelligible to a lay audience which is willing to be attentive for a sufficient number of hours. The troubles are that the time occupied would certainly be desperately long if every technical word had to be treated by periphrasis, and that a great many of the topics arising at a meeting such as that of the British Association would be of no interest whatever to an average gathering of citizens. The public is beginning to believe that natural knowledge is of real importance and is anxious to know what is going on. Their desires are being met to a considerable degree and much admirable work is being done in making the results of scientific research available to the mildest curiosity; some first-rate examples have issued in recent years from the lectures at the Royal Institution, and it is difficult to avoid reading recipes for health which at any rate purport to be in line with the very latest discoveries in medicine. So much indeed is being done in this way that we do not believe there is any reason why the technical austerity of the language of the British Association should be in any degree tempered. That historic assembly is a meeting of scientific men who want to talk and sometimes to listen to one another; it does for them by way of a personal gathering what *Nature* does for them by way of a periodical.

SPA TREATMENT OF RHEUMATIC HEART DISEASE IN CHILDREN.

OF late years various attempts have been made abroad to treat cardiac rheumatism in children by hydrological methods after the acute signs have subsided. E. Feer,[1] of Zurich, recommends a mild Nauheim cure in after-treatment, and considers that even when compensation is beginning to fail it may be useful to give CO_2 baths at home, or at Nauheim or some similar spa, in conjunction with prolonged rest. Piatot,[2] again, has reported encouraging results from the use of effervescent baths, subthermal rainbaths, and subaqueous douches in recent cases of rheumatic endocarditis in young subjects, and considers that "cases should be submitted to treatment of this kind three to six months after the onset of the rheumatism, even if the joints are still painful." It is interesting, therefore, to find that physical treatment of the condition is being used as a routine at the Auguste-Viktoria Kinderheilanstalt at Bad Oeynhausen in Westphalia. This home has 220 beds for children of 4 to 14 years of age who are recommended for admission by the medical officers of neighbouring municipalities, which pay the whole or part of the cost of treatment. Though the patients are chiefly rheumatic, there are also anæmic and pre-tuberculous children. A special house of 25 beds has been set aside for cardiac cases, of which the majority are, of course, rheumatic. After a preliminary period of observation lasting three days, during which these children are kept in bed and the pulse, temperature, and blood pressure are recorded, as well as their exercise-tolerance in response to a standard test, the patients are treated by baths, under very careful supervision. The first two or three baths are of 2 per cent. saline or 3 per cent. for the older and stronger children, and are given at a temperature of 93° F.; the first lasts from 6 to 10 minutes and the subsequent ones last for from 12 to 15. Usually three baths a week are given. Unless symptoms such as dyspnœa develop the children are later allowed to go on to CO_2 effervescent baths, which are given at 90° F., and also last for 12 to 15 minutes. The baths are taken at 7 A.M. after a light breakfast, and the children rest in bed for two hours afterwards; in addition, they have two hours rest daily in the open air under a shelter. No salicylates or other drugs are given, except to the anæmic children, who receive iron and arsenic, together with a natural effervescent water containing arsenic and sodium chloride from the Max Spring at Dürkheim. All the children do graduated exercises for not more than ten minutes at a time under the strict supervision of an experienced instructress, and rest for a quarter of an hour afterwards; deep breathing exercises are not permitted to the cardiac cases. The complete course of treatment lasts six weeks. The children are examined on arrival and before discharge and once a week during their stay at the home. The case records are subsequently sent to the municipal medical officer who recommended admission, and he, in turn, examines the child as a routine three months after discharge, or sooner if the authorities at the home consider it advisable, and sends a copy of his report to the medical officer of the home. If necessary the child can then be sent back for a further four weeks' treatment, or the treatment may be repeated in successive years. Those in charge of the treatment consider that their results are very good.

[1] Lehrbuch der Kinderheilkunde, eighth edition, 1922.
[2] See Archives of Medical Hydrology, January, 1925, and January, 1927.

PRESERVATIVES AND POISONS IN FOOD.

ONE result of recent enactments about preservatives in foods has been the appearance of papers showing that a number of natural or simply prepared food substances supply their own preservatives. Fruits such as cranberries and bilberries contain benzoic acid; boiled sugar sweets, caramel, and smoked fish contain formaldehyde; and Mr. Scott-Dodd has shown that cacao beans may contain from 0·02 to 0·08 per cent. of boric acid, which apparently is also found in some untreated wines. Though it is improbable that sulphites will be found in natural products it might constitute a good fighting defence, in proceedings under the Food and Drugs Acts, to show that products containing sulphurous acid had been grown on the slopes of an active volcano. Poisons or substances more definitely poisonous than preservatives are also found in foods. Not long ago[1] we reported the discovery of arsenic in shell-fish, especially crustaceans, and it may be noted that Mr. R. E. Remington in the United States has found this substance in both

[1] See THE LANCET, 1926, ii., 1229.

smoking and chewing tobaccos in amounts reaching over gr. ¼ per lb., though the prohibitive cost of tobacco in this country makes this form of arsenical poisoning impossible for any but the wealthy. It is at first rather startling that foods and other articles which are more or less consumed by man should contain these ingredients naturally, and that these discoveries should be made at a time when we are seeking by enactment to obtain foods which are free from them. Consideration shows, however, that this is quite in the normal course of events. Plants are only to a limited extent selective in their abstraction of nourishment from the soil, and are likely to take up such small proportions of substances like borates as they can tolerate or to allow arsenates partly to take the place of phosphates. The inhabitants of the sea live in a medium which is a dilute solution of all the crust of the globe. It is essential for them to tolerate traces of all the elements and they may be able to utilise rather unusual ones in certain circumstances. These facts, so far as preservatives are concerned, are being found out in the course of exploring the natural defensive properties of food—properties which need exact investigation rather than intelligent surmise. In general the amounts of toxic or objectionable substances are small. Their presence under natural conditions must make the analyst carefully consider in every case whether there is good evidence of their having been artificially added; it gives no reason for supposing that it does not matter how much of these banned substances are contained in any food. The main object of restrictive legislation is to remove the possibility that any normal diet may contain them in harmful quantities.

OVARIAN HORMONES.

THE problem of the internal secretions of the ovary is becoming extremely complicated. There now seem to be four, and possibly five, different types of ovarian secretion—a sex-producing hormone, an œstrus-producing hormone, possibly two hormones derived from the corpus luteum, and a substance causing parturition. Hitherto, the interstitial cells have been generally regarded as the source of the hormone which influences the development of female secondary sexual characteristics, but opinion is by no means unanimous about this, and it is pointed out that these cells are not present in all species. Certain experimental facts, nevertheless, are well established. If both ovaries are removed in a young subject, not only do the uterus and external generative organs fail to develop, but the secondary sexual changes also either do not occur or are greatly modified; in older individuals regressive changes take place. If a suitable piece of ovary is transplanted into a spayed female, the sexual characteristics return, and if ovarian tissue is grafted to a male the animal becomes feminised. Moderate experimental exposure of the ovaries to X rays has been found to cause atrophy of the follicles (incidentally preventing formation of corpora lutea) whilst leaving the interstitial cells either unaltered or hypertrophied. Under these circumstances the uterus and secondary sexual characteristics also remain fully developed, which affords the chief evidence that the sex-producing hormone is derived from the interstitial cells and not from the follicles.

The œstrus-producing hormone (œstrin) and those formed by the corpus luteum seem to be intimately associated with the events of the œstral and menstrual cycles, and A. S. Parkes has shown that hormones from the corpus luteum are apparently necessary for the continuance of pregnancy. It has also been suggested by Parkes and C. W. Bellerby [1] that during pregnancy the corpus luteum exerts an œstrus-inhibiting influence which can be over-ridden by injections of œstrin, a substance which in sufficient dosage will terminate pregnancy both in its early and its later stages. This effect of œstrin in early pregnancy has been confirmed by L. Brouha and H. Simonnet, and the view that an œstrus-inhibiting factor is present at this time is strengthened by the observation that œstrin can readily be extracted from ovaries of pregnant animals and is also present in the placenta. Brouha and Simonnet [2] have also lately studied the effects of injections of œstrin in a series of animals before puberty, in adults in full sexual activity, and after the menopause, and in castrates, and their investigation has fully confirmed the original researches of E. Allen and E. A. Doisy. They found that injections made in animals just before puberty brought on œstrus just as it did in the other experimental animals; this induction of œstrus was always accompanied by growth of the uterus and by other characteristic changes in the genital tract. The use of œstrin in clinical work seems to be indicated when effects leading to menstruation are required, but so far its use in human beings has not been satisfactory. Œstrus and menstruation are not homologous, and in menstruation it is necessary to take into consideration other factors, notably the part played by the corpus luteum in inducing pre-menstrual changes in the endometrium. According to R. Schroeder,[3] ovulation occurs in the human subject between the fourteenth to the sixteenth day after menstruation, and the corpus luteum which is formed prepares the uterus for the succeeding œstrus. On the twenty-eighth day and during menstruation the corpus luteum is degenerate (W. Shaw [4]). Experiments have been reported by E. C. Dodds, F. Dickens and S. Wright,[5] and by E. Allen [6] in which definite menstrual phenomena have been induced in a monkey and in oöphorectomised monkeys and women by injection of follicular fluid. The work of Parkes,[7] however, indicates that the cycle cannot be entirely dependent either on Graafian follicles or corpora lutea, for his experiments with X ray sterilisation show that periods continue after both follicles and corpora lutea have been destroyed.

Lastly, there is the extract, for which Prof. W. E. Dixon is responsible, which can be obtained from the ovary at certain periods, especially during pregnancy, and on injection into animals brings about a secretion from the posterior lobe of the pituitary body into the cerebro-spinal fluid. Prof. Dixon believes that this plays a considerable part in the emptying of the uterus at the termination of pregnancy. The researches of Allen and Doisy with œstrin have certainly given a fresh stimulus to research on ovarian internal secretion, and it should not be long now before the fruits of this work are seen in clinical medicine.

[1] Jour. of Phys., 1926-27, lxi., 562.

THE AMERICAN HEALTH UNIT.

MODERN society has inevitably created a demand for larger administrative units in the conduct of public health, with resources adequate to their functions. Development in America is discussed in a booklet called "The County Health Unit," issued by the Milbank Memorial Fund. It describes a conference called recently by the Governor of New York State (Hon. A. E. Smith) to draw attention to the advantage of organising rural public health work on a county basis. Mr. Smith's views were thus expressed in his message to the State legislature in January, 1926: "The unit for local public health work should be the county, with a full-time qualified county health officer who should be made responsible for the conduct of local health matters within his jurisdiction, with any such supervision as the State may be required to give in an advisory capacity. Such an organisation has been possible under the law (in New York State) for several years; yet only one county—namely, Cattaraugus—has seen fit to take advantage of it, and with the very best results in promoting the physical welfare of the inhabitants. Other States have made notable progress in county health administration, and there are now some 307 such organisations throughout the

[2] Brux. Méd., 1927, Nos. 42 and 44.
[3] Arch. f. Gyn., 1914, cl. [4] Jour. of Phys., 1925, lx., 3.
[5] Biochem Jour., 1925, xix., 853. [6] Anat. Rec., 1926, xxxiii.
[7] Proc. Roy. Soc., 1927, ci., 71.

country." By a law of 1924 the State reimburses half the expenditure of the county boards of health, and the advantages which have apparently accrued to Cattaraugus county so impressed the conference that it commends the "larger health unit" plan to the other rural counties of New York State.

The immensity of the task before the United States was indicated by the statement that in the 48 States there are over 3000 counties, some 2700 of which are predominantly rural. At the opening of the century the mortality-rate of the rural districts was about 75 per cent. of that in the cities; of late years it has been 8 per cent. or 10 per cent. higher. As a rule the county is a suitable unit but in sparsely inhabited areas several counties would have to combine. It is not proposed to abolish the town and village health officers; they are to become deputies of the county officers. On the other hand, State aid will not be given to villages and towns on the grounds that they are too small to carry on a satisfactory public health programme. A minimum estimate of the staff required for a county unit includes a health officer, two or three public health nurses, a sanitary inspector, and a clerk-stenographer, their total salaries amounting to about $24,000 a year. The health staff of Cattaraugus county now numbers about 40, and to the $56,000 contributed towards their maintenance by the county and the State the Milbank Memorial Fund has added another $65,000. A large proportion of the Fund's income is used to finance rural health demonstrations as models for other districts.

THE SIGNIFICANCE OF A PIRQUET REACTION IN CHILDHOOD.

EVERY medical society worth its salt has its great days—days, or rather evenings, when a paper is read by the author of some "epoch-making discovery." A lively discussion follows, the potential maker of an epoch being supported by his coöperators and the inevitable optimist, and criticised by those whose appetite for the epoch-making discovery has become a trifle jaded. Apparently it was at such a meeting that Dr. Heimbeck read the paper on tuberculosis in nurses, to which reference has already been made in THE LANCET (August 6th, p. 290). It will be recalled that Dr. Heimbeck's Pirquet examination of probationers showed that over 50 per cent. gave a negative reaction, but that after a year or more practically every nurse was Pirquet-positive. What was passing strange was the observation that, of the 43 nurses who developed tuberculosis during their hospital service, as many as 40 had been among the Pirquet-negatives; only three had given a positive reaction when starting work in hospital. Conclusion: the young nurse who is Pirquet-negative in a hospital where she has to work hard and may be exposed to tuberculous infection is in grave danger. The spirited discussion following Dr. Heimbeck's paper included a most interesting contribution from Prof. Frölich on the value, or rather the disadvantage, of a positive reaction, at any rate as far as children are concerned. During the period 1912–15 he carried out a series of Pirquet tests in school-children. In 1925, with the help of Dr. Jörgensen, he re-examined 1830 of the 2400 (approximate figures) 7-year old children who, in 1912, had given a positive reaction. Of these persons, now 20 years old, as many as 223, or 12·2 per cent., had contracted some form or other of tuberculosis. On the other hand, of the 332 Pirquet-negative 7-year old children examined in 1912, only 9·3 per cent. were found in 1925 to have developed some clinical form of tuberculosis. If a conclusion is warrantable on the basis of these figures alone, it is that a positive Pirquet reaction as early as the seventh year of life is no cause for rejoicing—rather the reverse. As for the intensity of a Pirquet reaction, it was found that the subsequent incidence of tuberculosis was considerably greater among the children who had given a violent reaction than among those whose positive reaction had been mild. There has been a tendency during the last few years to regard the Pirquet test as so thoroughly "worked out" as to belong rather to routine and the clinician than to research and the research-worker. But the Norwegian workers have shown that this test may still have some surprises in store for us, and that it may be exploited in clearing up some of the still unsolved problems of immunity in connexion with tuberculosis.

THE REGISTERS OF APPLEDORE.[1]

PAROCHIAL documents, such as transcripts, registers, and churchwarden's accounts, are always interesting to read as preserving items of manners and customs which have either passed away or else are survivals of older customs. "But the Iniquity of Oblivion blindly scattereth her Poppy," and in many cases such documentary evidence has perished owing to lapse of time, to the carelessness of those who should have been the guardians of the records, or to the lust for destruction of so-called reformers. It is therefore a praiseworthy task that Dr. Cock has undertaken in stringing together pearls of information for the benefit of readers who have neither the time nor the ability to seek out and decipher the sometimes crabbed writing of registers and transcripts. Registers of births, deaths and marriages were first ordered to be kept in every parish by Thomas Cromwell, Henry VIII.'s bully, in 1538, so that shady personage has at least one good deed to his credit. Transcripts, copies of the registers, were sent up twice a year to the Archidiaconal and Consistorial Courts, and the series for Canterbury is, says Dr. Cock, the most perfect in England. From these transcripts the little book before us has been compiled. The documents examined are for Appledore and Eboney, and date from 1563–4 down to 1812, with a regrettable gap for the period 1642–1660—i.e., the Civil War and the Commonwealth. Dr. Cock notes that in the year 1591 there were several entries of burials of poverty-stricken people, such as, "John Cox a householder but extreme poore," and says that, according to the Rev. J. Johnson, vicar in 1700, most of the inhabitants were very poor; he surmises that this poverty was due in great part to malaria, which, as Appledore and Eboney are just on the edge of "The Mesh"—i.e., Romney Marsh—is very likely true. The Mesh in the eighteenth century and on into the nineteenth was a curious and somewhat uncivilised place in many ways. Most people who have any knowledge of the district will recall the incident recorded in the life of the Rev. R. H. Barham, of "Ingoldsby Legends" fame, who was curate of Snargate and Warehorn in 1817. In a house in the former village he was one day invited to partake of dinner, the dinner being what was known as "jump short pie." Barham ate his portion, praised it, and asked why it had such an odd name. His host explained that it was lamb. "You see, sir, the young lambs on the Mesh try to get over the drains; a many of 'em jump short, tumble in, and get drowned. Then we hook 'em out and put 'em in a pie. Have another help, sir?"

Of medicine Dr. Cock makes frequent mention. In referring to the preventive use of quinine he says that when this drug was first sold in the neighbourhood, about 1850, it cost £8 an ounce. Small-pox is noted in the register as a frequent cause of death, and in 1773, between Sept. 13th and Oct. 16th, four deaths are entered from this cause. In 1725 two men and their wives did public penance in church, and in 1728 a young woman did the same; all for breaches of the Seventh Commandment. In 1753 Peter Hook, the parish clerk, dropped down dead while repeating the Confession. Dr. Cock reminds his readers how the parish clerk used to lead the responses, and how often the whole service was a duet between parson and clerk. It is not generally known that one of the duties of the clerk is to read

[1] Notes from the Transcripts and Registers of Appledore, Kent. By F. William Cock, M.D., F.S.A. 1927. Pp. 17. 1s.

the Epistle when the priest is single-handed at the service. There is an appendix specially dealing with medical men in Appledore, and in reference to one of them, William Durand, buried October, 1792, Dr. Cock quotes an advertisement from the *Kentish Gazette* dated July 14th, 1770, wherein Mr. Durand informs the neighbourhood of his intention to practise, and sets forth his qualifications for the same in no unassuming terms. Of one Daniel Price, who combined the professions of preacher and doctor, Dr. Cock notes that he used to bleed himself profusely for any ailment, and in the end bled himself to death. Readers of *Waterton's Journals* will remember how he used to bleed himself to a pint or so and also take 20 gr. of calomel, for Demerara fever, without, however, any untoward results. We note that Dr. Cock's delightful little pamphlet is to be sold for the benefit of the Village Hall Fund, and surely the fund should benefit largely. Such information as it contains is not only of interest but of value, and it is only fitting that a medical man, a member of a profession which together with the clergy sees more into the ways and hearts of their fellows than do other men, should have devoted his time to recording these happenings.

THE PATHOLOGICAL EXAMINATION OF FRESH MATERIAL.

IN the course of the elaboration and improvement of laboratory technique there is a tendency for old and simple methods to fall into disuse. For the most part the newer methods have certain obvious advantages, sometimes, however, there is a loss. The paraffin method of cutting microscopical sections affords an example. This method on its introduction offered such obvious advantages over those previously in use that it was universally adopted, and to-day, to the vast majority of those not actually engaged in laboratory work, a section means a paraffin section. The method has the obvious disadvantage that, in the course of embedding, the tissue is submitted to very drastic usage and to the action of solvents which bring about great alterations in the character and contents of the cell. It is only necessary to read some of the descriptions of the older histologists, based upon the examination of fresh tissue, to realise what has been lost by this advancement in technique. Some of the advantages of the examination of fresh tissue were made clear and a simple technique described by Dr. B. J. Terry [1] at the meeting of the Pathological Society of Great Britain and Ireland in July last. This method consists in the examination of moderately thick sections of tissue, the upper surface of which is lightly stained. The sections are rapidly mounted on an ordinary microscope slide and illuminated by a strong beam of transmitted light. Probably this method was new to the majority of those who saw the demonstration, but it was by similar methods that the foundations of histology were laid. The routine examination of the blood forms another example of a procedure in which observation is now made almost entirely upon grossly altered material. In investigating a blood picture the present-day pathologist hardly ever by any chance makes an observation upon the blood as it leaves the vessels, without drying, staining, or mixing with some diluting fluid. Yet, as was well known to earlier workers, the appearances provided by the blood from the time it has left the vessel until clotting is complete may provide interesting and perhaps valuable information. In an address before the Société Médicale des Hôpitaux de Paris, Prof. Hayem [2] pleads for a return to the examination of "sang pur." Prof. Hayem many years ago perfected and described the examination of blood *à rigole*, but it is a procedure which has dropped from the armamentarium of the modern hæmatologist. The principal information to be derived from this method depends upon the rate of formation of the fibrinous network. A characteristic heavy network is quickly formed in pneumonia and rheumatic fever; it is scanty and tenuous in the enteric fevers. Observations upon the presence or absence of a leucocytosis can be readily made at the same time that the fibrinous network is being examined, and the two observations together may frequently give valuable information.

[1] Terry: Jour. Path. and Bact., 1927, xxx., 3.

[2] Hayem: Bull. et Mém. de la Soc. des Hôpitaux de Paris, July 28th, 1927.

THE SOURCE OF VITAMIN D.

THE resolution of discord gives as much satisfaction in the realm of medical science as in the realm of music. If contradictory views on, for example, the ætiology of an obscure disease are voiced in different centuries, their fusion into a workable theory is a matter for rejoicing; but when the controversy has been waged between two contemporary schools of physiology in our own times, and the views appeared to be irreconcilable if not mutually contradictory, the discovery that both sides are right is wonderful. The ætiology of rickets has been in dispute for a long time. For years one school of physiologists maintained that it was a deficiency disease, due to lack of a vitamin, whereas the evidence supplied by another, the Glasgow school, pointed to lack of fresh air and sunlight as the chief factor in its production. Heated discussions were reported in scientific publications, where each side described ingenious controlled experiments designed to test the theory. Gradually, as our knowledge of the properties of the various accessory food factors, and the symptoms exhibited by those whose diet was deficient in them, increased on the one hand, and the manifold effects of prophylactic and curative radiotherapy developed on the other, the protagonists became less virulent, and it dawned on them and on others that possibly sunlight could in some way compensate for lack of adequate diet. The mechanism whereby this might occur was for a long time obscure. Controlled work among children in Vienna just after the war, combined with results obtained elsewhere, left no doubt that rickets can be prevented or cured by dietetic measures, or by heliotherapy. At the same time K. Huldschinsky made the discovery that rickets could be cured by treatment with ultra-violet light from an artificial source. It thus became clear that the conflicting views of the ætiology of rickets were both correct. The strange fact that light can act as a substitute for diet in this connexion still remained an anomaly, which only slowly resolved itself. The various steps in its resolution, demonstrating the mechanism whereby each of the two factors exercises an antirachitic effect, have been chronicled in our columns during the last few years. The discovery by a number of workers independently that antirachitic potency can be imparted to inactive articles of diet, chiefly fats, by exposure to ultra-violet light first gave an indication of the explanation. This discovery was pushed further, and cholesterol, having the characteristics then known of the "chemically pure" substance, was found to be the constituent of these inactive bodies which were capable of activation. When purified still further, however, cholesterol lost this property. Eventually in THE LANCET of Feb. 5th, 1927, Mr. O. Rosenheim, F.R.S., and Mr. T. A. Webster explained their reasons for concluding that ergosterol, a highly unsaturated sterol, is the direct precursor of vitamin D. In a communication to our present issue (p. 622) the same observers add some further chapters to the complicated story. Their recent work seems to bring the matter to the point at which one can say, with scientific precision and not merely as a guess, that sunlight and cod-liver oil both cure rickets, because sunlight produces in the skin, from which it is absorbed, the substance which cod-liver oil provides ready made. But the position even now is far from being a simple one. Indeed, facts are coming to light which show that the reaction by which the vitamin is formed when ergosterol is exposed

to ultra-violet light is highly complex, and the possibility that the pro-vitamin is not ergosterol at all but an impurity is still not wholly excluded.

SIR WILLIAM GLYN-JONES.

WE regret to learn of the death of Sir William Glyn-Jones, the well-known pioneer in modern pharmaceutical developments, which occurred from cerebral hæmorrhage on Friday last, Sept. 9th, at Vancouver, where he had recently gone to take up the position of chairman of council of the newly formed Proprietary Articles Trade Association of Canada. He did more than anyone of his generation to raise the standard of the pharmaceutical profession.

William Glyn-Jones was born in Worcester in 1869, and spent his whole life in the interests of his chosen calling. As an assistant in a chemist's establishment in the east end of London, he found time to eat his dinners, and was called to the Bar in 1904. But he had already come into public view, for as much as 30 years ago he founded an association to put down certain abuses in the trade of patent medicines which were oppressing the best sort of retail chemists. At that time the sale of some obviously quack nostrums was used by unscrupulous traders to attract customers to their shops, the articles being sold at prices which yielded no profit. Dispensing chemists who did not relish these advertising methods were suffering in their conduct of legitimate business, and the new association was designed to put a stop to the evil by bringing manufacturers, wholesale druggists, and retail chemists together to remedy the situation. Regulations accordingly were made by which no proprietary medicine, the makers of which belonged to the association, could be sold below a fixed minimum price; any retailer who violated the rules was placed on a "stop list" and prevented from obtaining further supplies of any of the "protected" articles. The economics of this arrangement were subjected to certain criticism from medical men; by bringing together the members of all sections of the drug trade, it was demonstrated that what pharmacy had long been looking for—namely, an organised plan of development—had been found. Those who saw in the movement nothing but a plan for securing to chemists a profit on proprietary medicine learned to appreciate that the outcome has undoubtedly been for the public benefit.

Sir William Glyn-Jones used the dominant position in pharmacy which he had now obtained in a worthy way. The formation of the Chemists' Defence Association, the severance from the Pharmaceutical Society's activities of the trading interests of pharmacy, the union of the Society with the British Pharmaceutical Society, and last but by no means least the establishment of the pharmacological laboratories, were all movements in which he played a prominent part. As Member of Parliament for Stepney from 1910 to 1918 he took an active part in the framing of shop hours legislation; he served his craft in Parliament manfully, sometimes in opposition to the medical view, when the National Health Insurance Acts were in the making; and, as an expert on poison and pharmacy law, he influenced legislation in the Dangerous Drugs Acts. In 1918 he became secretary and registrar of the Pharmaceutical Society, which post he held until he took up his important duties in Canada. He was knighted in 1919 in recognition of his eminent services to the pharmaceutical profession.

THE NEW PRINCIPAL OF THE ROYAL VETERINARY COLLEGE.

Prof. Frederick T. Hobday, veterinary surgeon to the King, has been appointed Principal of the Royal Veterinary College of London in succession to Sir John McFadyean. From the time of his qualifying in 1892, he has devoted himself to the various aspects, scientific and practical, of veterinary medicine and surgery. He first attracted the attention of the College authorities by the development of the out-patients' clinic which, as professor of materia medica and therapeutics, came under his control. This valuable work he enlarged from the teaching aspect until two clinical assistants had to be appointed to assist in the administration and teaching. His next activity, which was largely recorded in various scientific and veterinary journals, comprised the investigation of anæsthetics for use in veterinary surgery, and in 1899 the College awarded him the John Henry Steel memorial medal as a recognition of the practical nature of his labours. In 1904 he became editor of the *Veterinary Journal* and shortly after a member of the Examining Board of the Veterinary College, and is now a member of the Council. During the war he was in command of one of the largest of our veterinary hospitals, while scientific medicine owes him a particular debt in that he was one of the chief promoters of the movement which brought into being the Section of Comparative Medicine at the Royal Society of Medicine.

WE regret to record the sudden death, on Sept. 12th, of Dr. Sydney Rawson Wilson, senior anæsthetist to the Royal Infirmary, Manchester. Dr. Wilson, who was 45 years old, has recently been working on impurities in ether, and published in THE LANCET of May 28th last an article on "Ether" Convulsions, which has given rise to much correspondence in our columns. It is feared that he was overcome while experimenting with an anæsthetic.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. R. Thompson is placed on the Retd. List with the rank of Surg. Capt.

J. H. Nicolson and R. Murray to be Surg. Lts.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Comdr. A. G. L. Reade to *Ramillies* for 14 days' training.

ROYAL ARMY MEDICAL CORPS.

Maj. J. A. Clark retires on retd. pay and is granted the rank of Lt.-Col.

Capts. to be Majs. (Prov.): J. W. Malcolm, G. K. Maurice (remains secd.), and R. F. Walker.

Capt. R. Willan, late W. Afr. Med. Serv., to be temp. Lt. and temporarily relinquishes the rank of Capt.

ARMY DENTAL CORPS.

Temp. Lts., Dental Surgs., Gen. List, to be Lts.: J. B. Cowie and R. E. Edwards.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Qrmr. and Lt. W. H. Brown resigns his commn. and retains his rank.

Capt. J. B. Scott to be Maj.

Capt. R. G. Michelmore resigns his commn. and retains his rank.

Lt. J. L. Johnston to be Capt.

General Hospitals: Capt. D. Mallam resigns his commn. and retains his rank.

ROYAL AIR FORCE.

Flight Lt. F. P. Schofield is granted a permanent commission in this rank.

Maj. A. K. Macdonald, Army Dental Corps, is granted a temporary commission as Squadron Leader on attachment to the R.A.F.

Flight Lt. G. A. Ballantyne, D.F.C. (Capt., Army Dental Corps), relinquishes his temporary commission on return to Army duty.

Squadron Leaders: P. H. Young to Headquarters Coastal Area; D. McLaren, to Hospital Orderlies Training Depôt, Halton.

Flight Lts.: G. J. Griffiths to Basrah Combined Hospital; J. M. Maxwell (Quartermaster, Med.) to R.A.F. General Hospital, Iraq.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXLI.—THE TREATMENT OF MYXŒDEMA.

THE treatment of myxœdema resolves itself largely into the administration in some form of thyroid extract or thyroxin, the active principle of the thyroid gland. Myxœdema is a true deficiency disease, and thyroid treatment is specific. Stress has also been laid on the necessity of removing any possible cause of thyroid depression which may exist at the time of observation, but in practice it is often found that when the disease has developed to the stage at which it can be diagnosed the causal factors are no longer playing an active part in its production. There may be an antecedent history of hyperthyroidism, the result of emotional stress or some septic process which has caused an exhaustion of the gland, or part of the gland may have been removed. Myxœdema may develop as the end-result of repeated pregnancies, or may appear with the termination of ovarian activity at the climacteric. Generally, however, there is little which can be done from the ætiological aspect of treatment, though it is always advisable to bear in mind the important part played by focal sepsis, intestinal toxæmia, and errors of diet, and to correct these as far as possible. Chief reliance must be placed on the administration of thyroid extract. It is to Prof. George Murray that we are indebted for the observation, in 1891, that the symptoms of myxœdema in human beings could be made to disappear by the subcutaneous administration of sheep's thyroid gland. Victor Horsley, previously to Murray's work, practised transplantation of sheep's gland into the tissues of a myxœdematous patient, but the results of this operation were unsatisfactory then, as they have been since, chiefly owing to the rapidity with which the graft is absorbed. The effects are only temporary and not lasting. Somewhat later it was shown by H. MacKenzie that extracts of thyroid gland taken by the mouth would also control the symptoms of the disease, and this has remained the standard method of treatment to the present day. With the advent of synthetic thyroxin (Harington, 1926), it seems probable that the use of gland extracts will gradually be discontinued, for the synthetic substance should be more dependable than the various preparations of thyroid extract now in use.

The chief difficulties in the past in obtaining satisfactory results in the treatment of myxœdema have been (1) the absence of any reliable method of gauging the dose required. Estimations of the basal metabolic rate are proving of considerable value. (2) The large number of different preparations of thyroid extract on the market and their tendency to vary in strength from time to time.

The Basal Metabolic Rate.

The basal metabolic rate is the rate of energy exchange in the body under basal conditions (after elimination of food, muscular exercise, and so forth). It can be found by measuring the amount of heat given out by the body in a given time, or indirectly by estimating the oxygen consumed per unit of surface area. This is the method employed clinically. A sample of expired air is collected by a specially designed apparatus while the patient is at rest and has fasted for 12 hours over night. The metabolism under these conditions is fairly constant for different individuals, and only varies within limits of plus or minus 10 per cent. In hyperthyroidism it may be as much as 75 or 100 per cent. above normal, whilst in myxœdema it may fall to 40 per cent. below normal. This test affords a means of accurately controlling the dosage of thyroid extract in myxœdema. It is scarcely necessary to point out that it must only be used as a supplement to clinical observation.

Thyroid Extract and Thyroxin.

The preparations of thyroid extract usually employed in the treatment of myxœdematous patients are fresh thyroid gland, desiccated thyroid gland (thyroideum siccum), liquor thyroidei (thyroid solution, B.P.1898).

In practice it is not perhaps sufficiently well recognised that these preparations are of different potency; unsatisfactory results often follow from the indiscriminate use of different preparations in any given case. The strength depends mainly on the iodine content of the substance employed. Of the preparations mentioned, desiccated thyroid is five times the strength of the fresh gland, 1 gr. of thyroideum siccum corresponding to 5 gr. of fresh or whole gland; 5 gr. of fresh gland has the same potency as 10 ♏ of liquor thyroidei. The following comparative table may be of use:—

Thyroid (desicc.) ..	¼ ..	½ ..	1 ..	2 ..	3 ..	4 ..	5 gr.
,, (fresh) ..	1¼ ..	2½ ..	5 ..	10 ..	15 ..	20 ..	25 gr.
,, (liquor) ..	2½ ..	5 ..	10 ..	20 ..	30 ..	40 ..	50 ♏

Since reliable preparations of desiccated thyroid are readily obtainable from most firms, it would seem advantageous to use this extract as far as possible in all cases.

Reference has already been made to the introduction of synthetic thyroxin by C. R. Harington. Clinical reports of its effects in myxœdema are still scanty.

D. M. Lyon and F. A. Redhead[1] report results obtained in two myxœdematous subjects. The metabolic activity of both patients increased immediately and rapidly, one by 26 per cent. and the other by 48 per cent. Corresponding rises in temperature and pulse-rate and decrease in weight accompanied the rise in basal metabolism. W. A. Plummer and W. M. Boothby have also made numerous clinical observations in cases of myxœdema with thyroxin, using the active principle isolated by C. C. Kendall from the gland in 1915. The results are apparently clear cut and almost quantitative when this substance is given intravenously. The myxœdematous symptoms are relieved, and it is calculated that 1 mg. of thyroxin causes an average increase of 2·8 per cent. in the basal metabolic rate, a 10 mg. dose raising the metabolism from minus 40 per cent. to minus 12 per cent. In a large series of cases this figure was remarkably constant. Intravenous administration is not essential; the same effect was obtained when thyroxin was given by the mouth. Thyroxin is now supplied commercially in doses of 0·2 mg., 0·4 mg., 0·8 mg., and 2 mg. to be taken by the mouth. Based on the percentage iodine content of the two preparations, 0·2 mg. of thyroxin (Harington) corresponds approximately in potency to two-thirds of a grain of the desiccated gland.

Management of a Case.

The therapeutic indications are, therefore, clear. The basal metabolism of a patient with myxœdema must be brought to the normal level and there maintained by an appropriate daily dose of thyroid extract or thyroxin in some form. In practice it is not possible to have estimations of the basal metabolic rate made often, and in the ordinary straightforward case it is certainly not necessary to submit the patient to the inconvenience of several estimations. An initial examination, however, may be of considerable value, and will give a good idea of the amount of thyroid extract which is likely to be required to raise the patient's metabolism to normal. To a large extent the basal metabolism runs parallel with the pulse-rate, so that for ordinary purposes the latter will usually be a sufficient guide, especially if it is used in conjunction with other clinical data, notably variations in the patient's weight. It is important to make routine observations when giving thyroid preparations by the mouth, and, owing to the variability in the extracts and in their absorption from the gastro-intestinal tract, to standardise clinically, or by means of the basal metabolic rate, not only the preparation but also the individual patient. After the initial tests it is usually sufficient to note the clinical effects when thyroid is given by the mouth. Most cases of myxœdema are extremely sensitive to this extract, so that it is best to commence with a small daily dose and gradually to increase it at intervals of a week or so until an appropriate maintenance dose has been found. A satisfactory result can usually be obtained by starting with gr. ¼ of the desiccated gland once a day, increasing to gr. ½

[1] Edinburgh Medical Journal, April, 1927.

twice a day at the end of a week, to gr. ½ twice a day at the end of another week, and later to gr. 1 twice a day. This is an adequate maintenance dose for the average case of myxœdema, and a larger one is seldom required. It is necessary, however, to judge entirely by results, and no rules can be laid down. The patients themselves often rapidly acquire a knowledge of what is the optimum dose for them and can give considerable help to the physician. They should be warned at the start that treatment will have to be continuous throughout their lives, and that successful results depend to a large extent on the systematic supply of thyroid extract in the correct dosage. Since the effects of the remedy are so obviously beneficial, there is seldom any difficulty in obtaining complete coöperation from the patient.

A warning is also necessary as to the symptoms of overdosage. It is often a good plan to stop the routine administration for a day or two each week, or for a few days each month, to avoid any accumulative effects. For the same reason attention to the bowels is advisable. If overdosage does occur, all thyroid should be stopped for a week or two and started again at half the previous dose. The extract should be discontinued during the course of any acute illness, or if any septic process is present, such as tonsillitis or pyorrhœa; under these conditions symptoms of hyperthyroidism are liable to appear if thyroid treatment is persisted with. The symptoms of an overdose are headache, nervousness, palpitations on exertion, diarrhœa, insomnia and mental irritability, and general malaise. There is also excessive loss of weight, tremor, and tachycardia. It is not difficult to detect signs of overdosage at an early stage, for when the myxœdematous symptoms have once cleared up the weight should remain more or less constant at approximately the average normal level of the patient before his illness.

Diet.—The value of any food as far as the thyroid is concerned is to a large extent dependent on its iodine content, and it has been shown experimentally that with an exclusive meat diet, in which the iodine content is low, the gland tends to atrophy. The same result is brought about by inanition. It is advisable, therefore, to see that the diet is adequate in quantity and quality. A mixed diet containing an abundance of fish, fruit, and vegetable is appropriate. Where myxœdema is associated with obesity a very much better result can often be obtained by a moderately severe restriction of carbohydrates. Less thyroid extract is generally required in these circumstances, and this is advantageous inasmuch as these patients often show a tendency to cardiovascular instability.

Cardiovascular Considerations.—Patients with myxœdema frequently have symptoms and physical signs of cardiovascular insufficiency. This may be coincidental or the result of the thyroid condition. The heart usually shares in the process of myxœdematous infiltration, or may be fatty. Arteriosclerosis is not an uncommon complication. In such patients, when thyroid extract is given in quantities sufficient to cure the myxœdematous symptoms, increased work is thrown upon the heart, and it may take time to adjust itself. It is usually advisable, therefore, for this type of patient to remain in bed during the first part of the treatment and to take no unusual exertion. In severe cases a course of digitalis or other cardiac therapy may be given before treatment with thyroid extract is started.

Conclusion.

The most essential features in the treatment of myxœdema are the removal of all sources of thyroid depression and the regular supply to the patient of some form of thyroid extract or thyroxin in the correct dosage. The results are generally satisfactory. The original patient treated by Murray was 46 years old and lived in good health for over 28 years after developing the disease.

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Special Articles.

THE PHOTOCHEMICAL PRODUCTION OF VITAMIN D FROM ERGOSTEROL.

BY O. ROSENHEIM, F.R.S.,
AND
T. A. WEBSTER.

(*From the National Institute for Medical Research, London.*)

THE recognition of the fact that ergosterol is converted by the action of ultra-violet light into a powerfully antirachitic substance raises new problems of scientific interest, bearing directly on the practical application of the discovery to the prevention and cure of rickets and osteomalacia, as well as to the general control of the calcium balance.

It may be readily conceded that the newly established facts signify a considerable step forward in so far as they place at least one of the elusive vitamins in a group of organic non-nitrogenous substances, immediately related to the sterols, which possess well defined chemical and physical properties.* Except for the fact, however, that one member of this group, ergosterol, is converted by the action of ultra-violet light into a resinous substance of high antirachitic activity, we know nothing at present. Not only is the nature of the intramolecular change induced by light unknown, but also other important questions remain unanswered, such as the optimum condition for the production of the vitamin, and the amount as well as the particular wave-length of radiant energy required to activate ergosterol. Nor do we yet know in exact figures what quantity of the vitamin so produced is required for the normal development of an animal of a particular species. We only know that the absolute quantity required of the pure substance must be very small, and that excess is apparently innocuous.

It is evident that the solution of these problems requires the collaboration of the biochemist and the physicist, especially in a study of the relationship of induced antirachitic activity in ergosterol to the latter's ultra-violet absorption spectrum. In this connexion it becomes necessary, in view of the tendency of some recent physical work on the subject, to point out that the problem of rickets—i.e., defective calcification in the growing child or animal—is essentially a biological one and, as such, can only be experimentally attacked and finally decided by animal experiment. Conclusions, unsupported by animal tests, drawn from the evidence of purely physical phenomena alone, such as measurements of ultra-violet absorption spectra, may be very misleading, as will be shown later. The spectroscope has afforded valuable confirmatory evidence, although by itself inconclusive, in the previous work on the nature of the vitamin's precursor (i.e., ergosterol), and will no doubt still be useful in further work on the isolation of the vitamin itself. Until this object has been achieved, however, the presence as well as the amount of an antirachitic substance can only be ascertained by the animal test.

When we established last year the fundamental fact that ergosterol is rendered highly antirachitic by irradiation,[1] we did not determine quantitatively the limit of its activity, and even in the subsequent joint work with Windaus, reported in THE LANCET,[2]

* These facts raise again the question of nomenclature; irradiated ergosterol is nitrogen-free and not an "amine." It has even been argued that it may not belong to the group of "accessory food factors" or vitamins at all, since ergosterol may possibly be synthesised by the body, as is cholesterol, and subsequently be activated by sunlight. In view of the historical development of the subject, however, it seems desirable to retain the name vitamin D until the time, probably not distant, when it can be definitely replaced by a more precise term, expressing its constitution.

we had only reached 1/250 mg. per diem of irradiated ergosterol as the lowest daily dose then tested on the rat. Further work [3] has now shown that the limiting prophylactic and curative dose falls into the surprisingly low region of from 1/10,000–1/20,000 mg. According to the results of Miss K. H. Coward, D.Sc., which she kindly allows us to quote, the calcifying effect of a specimen of irradiated ergosterol, prepared by ourselves, can still be demonstrated even with a dose of 1/100,000 mg. per diem by means of the "line test." The results of the animal experiments have been fully confirmed by the clinical experience so far reported. Human rickets is rapidly cured by doses of 2–4 mg. of irradiated ergosterol per diem,[4,5,6] the rapidity of the cure exceeding, in the opinion of two observers, that achieved by cod-liver oil or direct irradiation.

Optimum Conditions.

Our first object, in continuation of this work, was to establish the conditions for the maximum production of vitamin D, when the ultra-violet radiations of the mercury-vapour lamp serve as a source of energy. A study of the time factor was made in the first instance by exposing 0·1 per cent. solutions of ergosterol in pure ether or alcohol for periods of from 30 minutes to four hours. The distance from the lamp was 20 cm. in each case. The effect of a longer exposure was not investigated in this series, since it is established that vitamin D is destroyed by prolonged irradiation. We have already reported that the typical absorption band of ergosterol gradually disappears on irradiation and that the precipitability of the product by digitonin decreases pari passu. On the assumption that the gradual disappearance of ergosterol during irradiation might serve as an index for the formation of vitamin D, we determined the amount of ergosterol remaining unchanged after these periods. The limited supply of pure ergosterol at our disposal prevented us from using the gravimetric digitonin method, and we therefore worked out a roughly quantitative method, depending on the determination of the dilution necessary to produce a just visible precipitate with digitonin. The minimum antirachitic dose of the various reaction products was determined by the animal experiment, using the technique previously described.

The results of a typical experiment are given in the following table:—

Time of exposure in minutes.	Solvent.	Appearance of residue.	Unchanged ergosterol.	Minimum protective dose per diem.
				mg.
30	Ether	White, crystalline.	90 per cent.	1/10,000
120	,,	White, partially crystalline.	40 ,,	,,
150	Alcohol	,, ,,	—	,,
240	Ether	Yellowish, resinous.	10 per cent.	,,

The surprising results of the animal tests prove conclusively (1) that under the above conditions the maximum amount of antirachitic activity is produced by irradiation for half an hour, or possibly less,† by the mercury-vapour lamp; (2) that prolonged irradiation—i.e., four hours—produces the same yield as a short exposure of 30 minutes; and (3) that the antirachitic activity of the reaction products does not increase pari passu with the disappearance of ergosterol, but remains constant.

This series of animal tests furnishes a striking experimental contradiction of the theoretical conclusions reached on the basis of spectroscopic observations only. It has been found that on irradiation of ergosterol a new ultra-violet absorption band makes its appearance, extending over the region 230–260 μμ, with a maximum at 247 μμ. This band has been assumed to be characteristic for vitamin D by Pohl [7] and Morton, Heilbron, and Kamm.[8] Without the evidence of animal experiments the latter authors conclude from their measurements that "anything approaching a satisfactory yield in the reaction requires prolonged irradiation" and "that the mercury-vapour lamp is unsuitable for this particular photochemical reaction." Both conclusions, which were made with reference to the industrial preparation of the product, are not in agreement with the results of the animal experiment. Whilst we are not concerned with the obviously important question of the most economical source of ultra-violet light suitable for industrial purposes, it may be said that no higher activity, as directly measured in animal experiment, has as yet been reported by the use of any other source (metallic sparks, &c.) than that described by us and obtained with the mercury-vapour lamp.

Various possibilities present themselves in explanation of the unexpected result revealed by the biological test. It may be due to the complexity of the reaction, which does not stop at the stage of vitamin formation, but proceeds further to its rapid destruction. The question whether a state is reached at which the two reactions, ergosterol—>active substance and active substance—>inactive products, proceed at equal rates, so that the activity remains constant till ergosterol is exhausted, is now under investigation. On the other hand, the possibility is not altogether excluded that the effect may be due to an impurity contained in ergosterol and identical with the one shown to be the cause of the induced activity of cholesterol. The position may be even more complex; both possibilities may exist together.

We have so far been unable to find any evidence for the presence of such an impurity in ergosterol. It must, however, be remembered that the present methods of purification are merely physical ones, such as are known to be inefficient in the purification of cholesterol. Unfortunately the chemical methods which helped us in the case of cholesterol (preparation of the dibromide, &c.) cannot be applied to ergosterol, since they lead to the destruction of this more labile molecule. We tested for the presence of an impurity in the first instance by a fractional recrystallisation of the acetate of ergosterol. We established the interesting fact that both ergosterol acetate and benzoate can be activated to the same degree as ergosterol itself. (This fact seems to show incidentally that the hydroxyl group is not concerned in the molecular change induced by ultra-violet light.) For the purpose of the fractionation experiment we started from the mixture of sterols (M.P. 154°), as it is obtained from ergot. According to Tanret [9] this contains besides ergosterol about 10 per cent. of another sterol, fungisterol. The absorption spectrum of the "crude" ergosterol was found to be identical with that of the purest ergosterol at our disposal, and its antirachitic activity after irradiation reached the usual high figure of 1/10,000–1/20,000 mg. Although we have not yet succeeded in preparing a fraction representing absolutely pure fungisterol acetate according to Tanret (M.P. 158°, $[\alpha]_D = -15{\cdot}9$), we were unable to detect any difference in the activity of the various irradiated fractions.

We further attempted to remove the supposed impurity by converting it into vitamin D by irradiation, and recovering the unchanged ergosterol. The partially crystalline product remaining after irradiation and removal of the ether was treated repeatedly with warm petrol, in which vitamin D and other reaction products are easily soluble, whilst ergosterol is relatively insoluble. The perfectly white product was recrystallised from 90 per cent. alcohol and showed the same melting-point (160–162°) and the same characteristic absorption spectrum as the starting product. We are continuing this experiment on a larger scale, controlled by animal tests, and subjecting the product repeatedly to irradiation and recrystallisation.

Failing any evidence of the presence of an impurity in ergosterol, which might act as the parent substance of the vitamin, we think that it is proper to adopt, at least provisionally, the view above indicated, that a

† It may be stated that an exposure of ten minutes failed to produce the maximum potency.

highly complex reaction results from the action on ergosterol itself of ultra-violet light, from any source containing radiations in the region of 320 μμ–230 μμ. This is all the more likely as it is known that vitamin D is a photochemically unstable substance, and since we are still in ignorance of the actual wave-lengths concerned in its production and destruction respectively. It is justifiable to assume, from such knowledge as we possess, that the mercury-vapour lamp emits radiations exerting both functions. It seems that the production of the active substance rapidly reaches a maximum, and that afterwards its destruction proceeds at the same rate as its formation, the exhaustion of the available ergosterol leading to its final disappearance. A solution of this problem should be possible by a systematic investigation, controlled by the animal test, of the effect on ergosterol of monochromatic radiations of known wave-lengths. This investigation is at present being carried out in this Institute.

Activation by Sunlight and Presence in Skin.

In preparation for this work we have investigated whether the activation of ergosterol can be effected by ultra-violet radiations of longer wave-length than those in which the maximum absorption by ergosterol takes place. This question is also of interest, as it has a direct bearing on the explanation suggested for the synthesis of vitamin D by sunlight in the animal organism, and on the consequent prevention or cure of rickets. The absorption spectrum of ergosterol begins approximately at a wave-length 320 μμ and shows three well-marked absorption bands, the strongest being at 280 μμ. It would naturally be expected that light of this wave-length would be particularly effective in activating ergosterol, especially since this band gradually disappears during the formation of vitamin D from ergosterol. On the other hand, sunlight which, after passing through the upper atmosphere, is free from radiations of shorter wave-length than 296 μμ, is known to have curative and preventive action on rickets when acting on the skin. Hume, Lucas, and Smith [10] drew attention to the difficulty which these facts appear to create for the view that the curative effect of direct irradiation of the child or animal by sunlight is due to the formation of vitamin D from ergosterol in the skin.

It may be pointed out, however, that we have previously shown that ordinary cholesterol is rendered antirachitic by exposure to the ultra-violet radiations of summer sunlight, as well as by those of the mercury-vapour lamp. This property was found to be due, according to our subsequent work, to the presence as an impurity in cholesterol, purified by physical means only, of traces of ergosterol or a similar sterol. We have since repeated the experiment with pure ergosterol itself.

A saturated alcoholic solution of the substance, contained in a quartz tube filled with nitrogen, was exposed from 10 A.M.–5 P.M. for four consecutive days (May 23rd–26th). During this period there were three cloudless sunny afternoons. The intensity of the ultra-violet radiations, as measured by the acetone-methylene-blue method of Webster, Hill, and Eidinow, amounted to 16 units. After evaporation of the alcohol the crystalline residue was dissolved in olive oil and its antirachitic activity tested by the methods previously described. It was found that a daily dose of 1/100 mg. of the irradiated product completely protected rats on a rachitogenic diet against rickets.

It is obvious, therefore, that the ultra-violet radiations of relatively longer wave-length contained in sunlight are able to effect the conversion of ergosterol into vitamin D. As in the case of the curative effect of direct irradiation on an animal, a longer exposure to sunlight would be required to induce as high an activity as that obtained by the more powerful artificial light.

In order to test this question still further, we used a screen of vitaglass in connexion with the mercury-vapour lamp. Previous spectroscopic measurements, kindly carried out for us by Dr. R. B. Bourdillon in this Institute, had shown that two sheets of the screen in use only transmitted to an insignificant extent radiations of shorter wave-length than 285 μμ.

The exposures varied from 4–5 hours and ether, alcohol, and petrol were used as solvents. The latter solvent was chosen in order to exclude the possibility of peroxide formation, which might have a deleterious action on the vitamin production. For the same reason, the alcoholic solution was irradiated in a nitrogen atmosphere. No difference in the degree of activation in the different solvents, however, was observed. The results are given in the following table:—

Distance from lamp.	Solvent.	Thickness of screen.	Time of irradiation.	Minimum protective dose.
20 cm.	Ether	4·8 mm.	5 hours	1/10,000 mg.
10 ,,	Alcohol	4·8 ,,	4 ,,	,,
20 ,,	Petrol	2·4 ,,	5 ,,	,,

It will be seen that in all cases the maximum activity was induced, identical with that observed in the previous experiments without the screen. We intend to investigate whether a shorter exposure under these conditions will suffice, and whether the screen will prevent the destruction of the vitamin in a prolonged exposure.

The results already obtained justify the conclusion that the long wave-length ultra-violet radiations of sunlight, and also those which penetrate vitaglass are able to convert ergosterol into a highly active antirachitic substance. It may be assumed that a similar process takes place in the prevention or cure of rickets by exposure of the skin to sunlight. The assumption of Holtz [11] that the skin may change the visible radiations of long wave-length into those of the essential short wave-length is totally unnecessary, in view of the fact that sunlight activates ergosterol.

The fat of the human skin contains a surprisingly large percentage of cholesterol, 13–24 per cent. according to the estimations (digitonin method) of Eckstein and Wile.[12] Since it had been shown [13 14] that the consumption of irradiated skin protects rats against rickets, it became of interest to investigate whether the cholesterol of skin contains ergosterol as an impurity, as do the preparations of cholesterol from all other animal sources. We had an opportunity of testing this question on several hundred grammes of fat obtained from pig's skin, which Dr. H. H. Dale put at our disposal. This was obtained as a by-product from an extract of skin, which Dr. H. C. Hagedorn, of Copenhagen, had kindly prepared for a different purpose. In a preliminary investigation cholesterol was easily isolated by saponification of the fat. The product, crystallising in the typical form from alcohol, possessed the M.P. 147–148° and, on examination of its ultra-violet absorption spectrum, showed an absorption identical with, but more intense than that of cholesterol from brain, described and illustrated in our previous work.[3] Further, it was found that the crystals fluoresced in the light of the mercury-vapour lamp, from which the visible light was screened off by "Wood's glass" and bromine vapour. Under the same conditions cholesterol, purified by way of the dibromide, was non-fluorescent, whilst ergosterol exhibited a strong light-blue fluorescence. It has been shown that vitamin D in irradiated cholesterol can be absorbed from a small area of undamaged skin in sufficient amount to supply the needs of the animal.[10] Taken in conjunction with all the established facts, the demonstration of a substance possessing the same optical properties as ergosterol in the cholesterol of the skin, offers an obvious explanation of the well-known curative effects of sunlight in rickets, the ergosterol in the fat of the skin being converted thereby into vitamin D.

Summary.

The lowest protective dose of vitamin D, induced by irradiation of ergosterol, was found to be 1/10,000–1/20,000 mg. per diem for the rat. The maximum

activity is produced within one half-hour by the radiations of the mercury-vapour lamp (under the conditions described) and remains constant on prolonged irradiation up to four hours. The amount of ergosterol disappearing during the reaction does not stand in relationship to the amount of vitamin present at any given time during this period. In explanation it is suggested that after a short initial period, the formation and destruction of the vitamin proceed at the same rate, so that the activity remains constant till the available ergosterol is exhausted.

Ergosterol is activated by the radiations of sunlight, as well as by the long wave-length radiations of the mercury-vapour lamp. This fact helps to explain the curative effect of sunlight in rickets. The full experimental details of this investigation will be published in full elsewhere.

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IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Health Reform in the Free State.

THE report of the Committee of Inquiry on National Health Insurance and the Public Medical Services [1] was unfortunate in that it was published in the daily papers on the day before the murder of Mr. Kevin O'Higgins, and therefore attracted little public notice. The first serious comment on it has now appeared in a memorandum adopted last week by the National Association of Insurance Committees. This body expressed its conviction that the only satisfactory solution of the problem of the provision of adequate medical treatment for the working classes and their dependents—whether insured persons or otherwise—lies in the immediate adoption of a national scheme of medical services on a contributory basis, comprehensive in scope and freed from all association with Poor-law administration. It is disappointing that the Committee has not recommended the immediate adoption of such a comprehensive scheme as a practical measure, for not only is the care of the public health one of the first duties of Government, but true national economy lies in the preservation of the working capacity of the people. Economy secured at the expense of the people's health is prodigal waste of a national asset. The Association agrees that unless a national scheme embracing insured persons as well as others is immediately adopted, the provision of medical benefit for insured persons is an urgent necessity, but it cannot commend the proposals for medical benefit adumbrated in the final report as satisfactory to insured persons. In its opinion, the very limited advantages which they might confer on certain classes of insured persons are not commensurate with the sacrifices which insured persons generally, as well as their employers, are called upon to make. The Association considers that any scheme of medical benefit to be satisfactory to insured persons must comply with certain essential conditions:—

(*a*) It must be completely dissociated from Poor-law administration.

(*b*) The treatment provided must be thoroughly efficient, which connotes agreement with, and the full coöperation of, the medical profession.

(*c*) Being on a contributory basis, its operation must be open to the free criticism of the persons whom it serves, and it must provide convenient machinery for the investigation of complaints. It must, therefore, be locally administered by bodies on which the contributors, as well as the other interests concerned, are represented.

The Association, as was to be expected, is opposed to the proposal of the Committee of Inquiry that insurance committees should be abolished and their duties transferred to the local authorities. It is satisfactory to find a representative body of this kind coming out strongly in favour of a comprehensive scheme of health reform.

Local Appointments.

By the terms of the Local Appointment Act, 1926, the local authorities were deprived of the power of choosing their officers, except in the case of transfer of existing officers. The nomination to each office is made by a civil service board, the Local Appointments Commissioners, who themselves are guided, in the case of medical appointments, by the advice of a Selection Board, consisting mainly of medical men of repute and good standing. When the Bill was before the Dail it met with considerable opposition, but nevertheless became law. It is only since the Act has begun to work that the members of the local authorities have begun to realise that they have no longer any power of patronage. Many of them are showing their anger by obstructing the working of the Act. One Board of Health, in disgust at failing to secure appointment to a vacant dispensary district for a local candidate, resigned in a body. A few years ago a member of the Board of Health of this same county served a term of imprisonment for having solicited bribes in regard to a dispensary appointment. In many other cases appointments have been delayed and wrangles have taken place between the local authority and the Department of Local Government and Public Health. The law cannot be evaded, however, and the Department is obdurate in insisting on its terms being obeyed.

From another side the work of the Local Appointments Commissioners and the Selection Boards has come in for some criticism which is more worthy of attention. As I understand it, the procedure is approximately as follows. When a vacancy, or more often a group of vacancies, has occurred in the dispensary medical service, an advertisement is issued, applications being invited. Each candidate, with his application, must pay a fee of £1. The list of candidates is submitted to the Selection Board, and in some cases at least the Selection Board has not merely scrutinised the claims and qualifications of the candidates, but has interviewed all the candidates. This appears to be unnecessary and unbusiness-like. There may be 50 or 60 candidates for one or two vacancies, and the Selection Board ought to be able to select, say, half a dozen of the most promising candidates on the documentary evidence submitted. The final choice should only be made after interview. It is grossly unfair to compel a few score candidates who have no chance of selection to travel from England, Wales, or the distant parts of Ireland, without any compensation or grant for expenses. Moreover, the tax on the time of the members of the Selection Boards who, up to the present, are giving their services gratuitously, is greater than need be. These faults are incidental to the system, but they are giving rise to considerable discontent and should be eliminated.

[1] See THE LANCET, July 23rd, p. 198.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

Lower Death-rate.

THE figures recently presented to the Vienna Municipal Board of Health show a remarkable improvement in the health of Vienna since the beginning of the century. In 1900, for instance, the mortality of infants during the first year of life was 178 per 1000, and even in 1913 it stood at 148; whereas in 1925 it had gone down to 80, this level being maintained in 1926. In other words, the decrease during the period has been over 50 per cent., occurring most rapidly since the war, in consequence of the organised care of infants instituted by the municipality. It may be noted also that the general mortality is steadily falling. In 1910–13 the average death-rates was 16·3 per 1000; between 1913 and 1919 it rose to 20·8, and after that went down till it reached its lowest level of 12·2 in 1925. The reduction was secured in spite of the hardships of the post-war period and the persistent unemployment of over 15 per cent. of the population. A death-rate of 12·2 is less than that of Munich, Breslau, and Warsaw (13–14), Paris (14–15), Budapest (16·5), and Rome (17–18), and is bettered only by a few German, Swiss, and English cities (between 9 and 11). Among the particular causes of death tuberculosis takes an important place, the proportion of deaths due to this disease being 20 per cent. in 1914, 28 per cent. in 1916, and 31 per cent. in 1918. This rise was, of course, attributable to the war. In 1920 the proportion still stood at 24 per cent., but in 1925 it fell to 15, which was less than before the war. Though the figure unfortunately went up again slightly in 1926, the systematic campaign against tubercle has done so much to bring down mortality from the disease that steady improvement may be expected in the near future.

Tuberculosis.

At a meeting of German railway doctors, held in Vienna a few days ago, Prof. Roepke read a paper on the principles of the campaign against tuberculosis. After reviewing the famous experiments of Koch he explained the methods of immunisation proposed by Selter (small quantities of living but much weakened bacilli), Friedländer and Calmette (large quantities of non-virulent bacilli), and Langer (dead bacilli). At present, he said, we are not in a position to state which of these methods is best for protecting people who are exposed to infection, and it will be at least 15 or 20 years before we can say definitely how the artificially produced immunity of the infant influences morbidity and mortality in the later years of life. Perhaps too much is expected of artificial immunity, and more stress should be laid on natural immunity acquired from a mild attack of the disease. The objective at present is to enable infants to survive the first two years of life without tuberculosis, for it is during this period that infection is most common and most deadly. With increasing age the natural powers of resistance in the child become capable of combating the bacilli, though they should be assisted by hygienic measures, including light and air. The second very important aim in the campaign is to remove the most serious source of infection—the patient with open tuberculosis. It is the paramount object of all prophylaxis to recognise patients with cavities in the lungs, especially adolescents, as early as possible, and to start regular treatment which will render them innocuous to their surroundings. Statistics show that, so far as Germany is concerned, the fight against tuberculosis is approaching its decisive and final stage; for since 1920 there has been a constant drop in mortality from 2·3 per 1000 in 1918 to less than 1·0 per 1000 at the present time in all towns with a population of 15,000 or over. A larger percentage of the affected persons are nowadays permanently cured, the chronic cases live longer, and fewer patients need be admitted to sanatoriums, all of which facts make it possible to be very hopeful about the ultimate issue. Optimism should be maintained, said Prof. Roepke, in spite of reports from cities such as Vienna, where the mortality is still 2 per 1000, or twice as high as in Germany. And even here, as I have indicated, the death-rate compares very favourably with what it was a few years ago.

Medical Congresses in Vienna.

During the last few years Vienna has been repeatedly selected as a meeting-place for German-speaking medical societies, perhaps because the city offers such good accommodation for large numbers of foreign visitors, and partly because it contains so many interesting medical institutions. In the last week of September the Convention of Surgeons from the Alpine Countries take place here; in the last week of September and the first week of October there will be a meeting of Austrian country practitioners, combined with a fortnight's international post-graduate course in therapeutics; and from Oct. 4th to 7th the Society for the Study of Diseases of Metabolism and of the Alimentary Canal will hold its seventh annual meeting in the city.

Dental Disease and Metabolism.

Dr. Josef Weinmann, in a paper recently read before the Vienna Dental Society, stated that he has observed that a large percentage of the patients who come to the dental clinic suffering from pyorrhœa or complaining of loss of teeth show signs of disturbed metabolism. Assisted by Dr. Liebesny he has investigated all such cases, and has found in over 80 per cent. of them definite diminution in the activity of the pituitary gland. Dr. Liebesny suggested the use of diathermy to increase the internal secretion, and this treatment was employed, together with internal medication (ovarian, thyroid, and pituitary extract). Dr. Weinmann found that the condition of patients receiving this combined treatment improved considerably in the course of some four to eight weeks. All the patients at the dental clinic are now being investigated on these lines, so as to give the new method an extensive trial before it is publicly recommended. The object of making a preliminary report is to induce other clinics to try experiments for themselves on the same lines and inform Dr. Weinmann of their results.

ROYAL MEDICAL BENEVOLENT FUND.

THE following are some additional cases relieved at the last meeting:—

Daughter, aged 56, of M.R.C.S. Eng. who died in 1873. Has lived with widowed sister, helping with domestic duties. Has a temporary allowance from brother-in-law of £5 5*s.* a month and pays £4 5*s.* towards board and room. Now recovering from a severe operation and asks for financial help towards convalescence. Voted £18.

Widow, aged 64, of L.R.C.P. Edin. who died in 1917. No children. Went as a clerk into the district county council, but has had to resign on account of ill-health. Remuneration from post, £118; investments, £4 per annum; health insurance, 7*s.* 6*d.* a week; Freemasons, £2; gift from staff on retirement, £22; friends, £3. Rent and rates, £17 per annum. Voted £26 in quarterly instalments.

Widow, aged 71, of M.R.C.S. Eng. who died in 1897. Only income £76 from investments. Pays 24*s.* a week for bed-sitting and board. Finds it very difficult to meet incidental expenses on such a small income and asked the Fund to help. Voted £18 in quarterly instalments.

Widow, aged 57, of M.D. who died in 1924. Son trained at horticultural college and has purchased a holding and bungalow, but unable to furnish the bungalow. Applicant asked for help towards this expense. £10 voted.

Wife, aged 62, of L.R.C.P. who has been in a mental hospital for 24 years. Has to support herself by cooking and pay 5*s.* a week towards her invalid daughter's board, who lives with married sister. The Fund has paid the husband's life insurance premiums for the past two years and this grant of £9 5*s.* 8*d.* has been renewed. £12 has been sent to the applicant for her own expenses.

Widow, aged 66, of L.R.C.P. who died in 1909. She and her niece have a boarding-house, but owing to the bad weather have been unable to let and are now in arrears for rates. Voted £13 as a special grant.

Subscriptions may be sent to the Hon. Treasurer, Sir Charters Symonds, 11, Chandos-street, Cavendish-square, London, W.1.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some of the 1926 statistics of five county boroughs:—

Name of district and estimated mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Resp. diseases with influenza.	Heart disease.	Diarrhœa under 2 years.	Infant mortality.	Maternal mortality from childbirth.
Birmingham (934,300) ..	19·2	11·6	1·10	1·29	2·2	1·7	11·2	73	4·1
Leicester (241,700) ..	17·0	12·3	1·34	1·63	1·9	1·6	8·5*	77	3·9
Derby (136,600) ..	19·0	10·9	0·88	1·16	1·5	1·5	7·0	67	2·3
Stockport (125,400) ..	16·1	12·8	0·73	1·44	2·8	—	2·0	82	5·0
Walsall (102,100) ..	21·1	11·1	1·15	1·16	2·1	1·4	11·6	84	5·1

* Under 1 year only.

Birmingham.

Sir John Robertson mentions that an "important step has been taken during the year in the provision of a site for hospital purposes, which in extent and situation will be sufficient for generations to come, and will enable the question of hospital provision to be put on a proper basis." [1] The Registrar-General's estimate of the population given above is nearly 27,000 less than the local estimate. According to the local estimate the birth-rate becomes 18·7 and the death-rate 11·3. The infant mortality-rate among illegitimate babies was 150, and it is suggested that the Act of 1926 will enable a larger number of these infants to be adopted. Of the 574 illegitimate babies born, 72 were in institutions at the end of the year, 56 died, and 58 removed before a visit was paid. In the case of the remaining 388, the father and mother were living together in 127 cases, the father was making an allowance under an order in 41 and voluntarily in 46 cases, the father was not contributing in 150 cases, and there was no information in 24. In view of the fact that the greatest amount of sickness occurs in February and March, a leaflet was distributed by the health visitors, advising that more time should be spent outside in the winter than in the summer in order to get the maximum advantage from the available sunlight. The wards in Birmingham are divided into central, "middle-ring," and "outer-ring." The death-rate from cancer is fairly equally distributed amongst all three. A leaflet advocating early diagnosis with a view to early operation in the case of cancer of the breast was broadcasted for the second time.

Nursing in the home is provided by 13 district nursing associations, which undertake the nursing of measles, whooping-cough, and pneumonia referred to them by the public health department, at a uniform charge of 10*s.* per case. The health visitors find great difficulty in dealing with the aged poor.

Considerable efforts are being made to improve the condition of the River Tame. The opening of the new refuse utilisation plant at Tyseley in June, 1926, had made it possible to close down five tips. This policy is being extended and the percentage of tons of refuse tipped has been reduced from 34 to 12 in the last four years. Two inspectors are regularly employed in seeing that the closets and drains of courtyards are kept in good order and certain of the courtyards are cleansed periodically by a staff of men. There were 196 excessive emissions of smoke, 93 from boiler fires, 27 from boilers and furnaces, and 76 from metallurgical furnaces. Eighty-eight prosecutions were undertaken and convictions were obtained in every case. The total amount of fines was £172, and it is pointed out that the new Act raises the maximum penalty from £5 to £50. The dirt content of the air was less than the average for the preceding four years. The grit nuisance from the use of inferior fuels with a forced draught, however, is becoming intolerable, and unless more efficient grit-catchers can be devised, action will have to be taken to prevent this method of raising steam.

The houses let in lodgings on the register number 696 and have "always been the bugbear of the public health department." Very inadequately furnished, they are let at exorbitant rents to the thriftless, careless, and poverty-stricken classes.

Notwithstanding the strenuous efforts to overcome the house shortage there is great distress and inconvenience from bad housing among the labouring classes. The houses completed in 1926 numbered 6934, of which 5159 were corporation houses. During the last two years about 4400 have been built towards the arrears of the last 16 years. At the present time old, worn-out houses are allowed to remain, and industries are cramped because they cannot turn out the tenants of the dwellings, which they have purchased for works extensions. The Lower Tower Street unhealthy area was "represented" in May, 1926. It covers 11·66 acres, 10 of which are occupied by dwellings and the remainder by workshops. The dwellings number 517 and house a population of 2703.

Most of the milk-supply is delivered once daily. About half is sterilised homogenised milk supplied in bottles and about a quarter is pasteurised. Particulars are given of the bacterial examination of samples of pasteurised milk. Out of 12 holder pasteurisers the samples from three exceeded the limit of 30,000 bacteria per c.cm., while out of nine flash pasteurisers the samples from four exceeded the permissible limit. The samples from two continuous flow-retarding plants complied with the regulations. There is still a prejudice against the use of pasteurised milk, and firms which hold licences for adequate pasteurisation do not use their licences to the full by selling all their milk in bottles as pasteurised. The public do not in fact realise that most of the milk in Birmingham is treated by heat, and they therefore prefer to buy "loose" milk to *adequately* pasteurised milk in bottles. The city cowsheds house about 1550 cows and among these 21 cases of tuberculosis were found during the year and slaughtered under the order. 811 samples of milk received from outside the city were examined for tubercle, and 8·8 per cent. were found to be infected. As the result of following-up, 63 tuberculous cows were found in outside farms, 44 with advanced tuberculosis and 19 with tuberculous udders. All were dealt with under the order. The Birmingham scheme for securing tubercle-free milch cows included 22 herds and about 696 cows during the year. At the half-yearly testings 71 failed to pass the test, although the majority of the herds are breeding herds. In one breeding herd of approximately 93 cows, 28 failed to pass the test during the year.

Up to the end of 1926 1099 children had been immunised against diphtheria, and since the end of the year the numbers have steadily increased. The use of scarlet fever antitoxin in the hospital appeared to diminish the number of cases with complications, and a full account of the benefits obtained by the surgical treatment of tonsils and adenoids in the promotion of more rapid convalescence of scarlet fever and diphtheria patients and the prevention of return cases is included in the report. The tuberculosis officer, Dr. G. B. Dixon, gives excellent radiograms to illustrate the use of radiography in the differential diagnosis of pulmonary disease, and also photographs showing the progress of cases of lupus

[1] See THE LANCET, 1926, ii., 916.

and abdominal tuberculosis with sinus under light treatment. Encouraging results have been obtained at the venereal diseases centre by the use of diathermy in the treatment of gonorrhœa in the female, and the results obtained by treating acute gonorrhœa in the male with intravenous injections of vaccines "have been extraordinarily good."

Leicester.

Dr. C. Killick Millard reports that his city was visited by a serious outbreak of poliomyelitis. There were 81 cases and seven deaths. Leicester has previously only had sporadic cases of the disease. The first cases occurred early in the summer, and there were 15 cases in August, 37 in September, and 14 in October. Of the 45 patients under 4 years of age, 16 were under 2. Twenty-four cases occurred during the 5–9 age-period, 2 from 10–14, 5 from 15–19, and 5 over 20 years of age. In no instance was more than a single cases notified from any one house, and in only three instances was more than one house in a street attacked. The cases were distributed throughout the city and social position appeared to have little influence upon the incidence of the disease. Of the seven fatal cases, four were of the fulminating type and were only ill four, five, and six days. Simultaneously with the outbreak in the city, there was an outbreak in the county of 69 cases, with the same want of evidence of case-to-case infection. Thirty of the cases were treated in hospital, but no members of the hospital staffs developed the disease. The disease was unduly prevalent in the country during 1926, and a chart shows that the chief prevalence in England and Wales was from August to November. Dr. Millard refers to the Edinburgh outbreak of 1910 and to the outbreak in the village of Stoke Rivers in Devon. In the former 62 cases occurred with no multiple cases in houses; in the latter 45 cases occurred within a few days in a village with a population of 119. Almost every house attacked had two or more cases, and most of the cases could be clearly linked up.

The Leicester Cancer Committee have carefully considered the establishment of a free clinic for early diagnosis, and the health committee have advised the council to establish such a clinic.

Diphtheria was unusually prevalent during 1926. There were 366 cases and 37 deaths. The mortality was highest at the age-period 5–9. The disease was widely scattered, and cases occurred at 53 schools. In 88 per cent. of the cases there was no spread of the disease to other members of the household. Dr. Millard thinks that a much stronger case could be made out for immunisation of all children against diphtheria than for vaccination, seeing that the mortality from small-pox for many years has been almost nil. He does not think, however, that Leicester with her past history would be likely to welcome immunisation against diphtheria, as it is somewhat in the experimental stage. As regards inoculation against "common colds," Dr. Millard cites the experiment carried out among the students of Manchester University, from which it appeared that the 138 inoculated students suffered from more colds than the 148 uninoculated.[2] He mentions, however, that the advocates of inoculation show that stock vaccines were used and that freshly prepared vaccines might have been of some value.

The total births were 4119, and the new cases attending the three antenatal clinics numbered 598. Orthopædic cases are already treated at Groby-road Sanatorium. It is proposed to provide there also a ward for poliomyelitis, and to establish an orthopædic treatment clinic in connexion with the school medical department. For the second year since the war the number of new houses has more than provided for the natural increase of the population, and has done something substantial towards overtaking arrears. Dr. Millard stresses the need for more playing grounds for children, especially in the more congested central areas. The ideal is for the present population in the central parts to be rehoused in the more salubrious outskirts. Under a street improvement scheme five common lodging-houses, accommodating 323 men, will have to be pulled down, and the present is a good opportunity for the establishment of a municipal model common lodging-house. The lectures for stokers have been a success; 49 were enrolled, and the average attendance was 39.

Four severe cases of puerperal fever were admitted to the sanatorium, and two died. A beginning has been made with the treatment of uterine sepsis by glycerine drainage.

Derby.

Dr. A. E. Brindley reports that small-pox continues to linger. The notified cases during 1926 numbered 759, and there were no deaths. The reasons given for the continuation of its incidence are failure or delay in notifying, concealment of cases, missed cases, and failure of contacts to accept vaccination. Dr. Brindley says that no contact vaccinated within the past 20 years has developed the disease. Ophthalmia neonatorum was slightly more prevalent. There were 18 cases notified, of which 9 were treated at home and 9 in hospital. One baby died, 1 was under treatment at the end of the year, and 1 had removed. Of the remaining 15, 2 had impaired vision. With the existing staff it is impossible to supervise the health of children between 2 years and the age of entrance to school. A special welfare centre for children of this age is recommended. There were 2596 births and 247 expectant mothers visited the antenatal clinic. A large consignment of Newtown apples was found to contain gr. 1/33 of arsenic per lb., or three times the amount allowed. These apples were twice washed and the amount of arsenic was finally reduced to gr. 1/240 per lb. Thirty-seven samples of milk were examined for tubercle, and two from outside farms were found to be infected. A long list of typical examples of overcrowding is given and also extracts from letters of application for new corporation houses. The new houses erected during the year numbered 1444, of which 1286 were part of a municipal housing scheme.

Stockport.

Dr. Nicolas Gebbie records an outbreak of pemphigus neonatorum in June and subsequent months. Seven cases occurred in the practice of one midwife and two of these proved fatal. The midwife went for a holiday and handed over her cases to another midwife, and 16 of the 28 cases which occurred were in the practice of these two midwives. The disease was made notifiable on Sept. 2nd, and from that date until March 1st only seven cases were notified, four of which occurred in the practice of a third midwife. With the exception of the two fatal cases, the type of disease was mild. There is a serious shortage of houses, but no case of dangerous overcrowding was brought to the notice of the medical officer of health during the year. A table shows that the population during the last ten years has been almost stationary. In September an official representation of an unhealthy area was made. Out of 12 samples of milk examined for tubercle one was found to be infected. As a result of following up, two cows were surrendered and destroyed. There were 24 notifications of ophthalmia neonatorum, and one baby born in the municipal maternity hospital lost the sight of an eye. The births numbered 2014. An antenatal clinic was opened in 1925 and attended by 61 mothers. During 1926 130 expectant mothers attended. Dr. Gebbie makes an urgent recommendation for the appointment of an assistant medical officer with special experience in maternity and child welfare work.

Walsall.

Dr. J. A. M. Clark, in drawing attention to the housing shortage and consequent overcrowding, mentions the fact that Walsall is the town with the ninth largest average family (4·61 persons) in England and Wales according to the 1921 census. Four

[2] See THE LANCET, 1927, i., 834.

hundred and sixty-eight new houses were built during the year, 374 by the local authority. The council do their best to encourage graded milk by obtaining Grade A and Grade A (tuberculin-tested) milk for the free issue to mothers. Diphtheria was very prevalent in the infant department of one school and 88 children received a full course of immunising doses. The privy conversion scheme makes progress. At the end of the year there were 520 privies, 10,498 water-closets with a proper flush, 9260 water-closets which have to be flushed by a bucket, 85 waste water-closets, and 25 pail-closets. An automatic atmospheric pollution recorder has been installed. During the winter months atmospheric impurity is greatest at 7 A.M.; decreases between 9 and 10 A.M.; is more marked again between 5 and 6 P.M., and decreases after midnight.

Midwives attended 1617 out of the 2104 births (76·8 per cent.) and sent for medical help in 243 cases, of which 84 were in respect of ruptured perineum. Dr. Clark describes these figures as startling, and says that both midwives and medical men called in by them show an equal unwillingness to allow Nature to take her course; there is too great a readiness to adopt instrumental methods. The inspector of midwives, who is herself a midwife, conducts the antenatal centre. According to circumstances, the abdomen is examined, the fœtal heart is listened for, pelvic measurements are taken, and the history of previous difficult labours is recorded; the urine is examined, advice is given about the hygiene of pregnancy, and the patient is referred through the midwife to her own doctor when difficulty is anticipated; 130 mothers attended this centre. In his school report Dr. Clark draws attention to the bad print of some of the text-books and to school desks of obsolete pattern which are too small for the children who use them. Defective vision, spinal curvature, and round shoulders are possible sequels. He finds that many children have already acquired a squint before attaining school age. An orthopædic clinic has been established, conducted by Mr. G. Percival Mills. There are 214 children on the list between the age of 5 and 16 suffering from crippling defects (including severe heart disease). The open-air school has had another successful year with an average attendance of 92. A permanent site has now been obtained for the school camp, and for five week-ends and one full week parties of boys from many schools enjoyed a real holiday under canvas.

PORT SANITARY AUTHORITIES: HULL AND GOOLE.

Dr. W. Allen Daley states that in spite of the coal dispute the trade of the port increased during the year. Over 12,000 vessels entered, of which 9 per cent. had sanitary defects. There were 490 insanitary (dirty) forecastles and 165 dirty food-lockers; 246 fresh-water tanks needed cleaning; 161 water-closets were choked; and on 41 ships the quarters were verminous. It is difficult to deal with infestation, and it is stated that the only remedy is to dismantle the parts affected, burn the old wood on board, and refit. Fumigation with sulphur is effective only when it is followed by another fumigation 10 or 12 days later, when the larvæ have hatched out. It was never necessary to issue statutory notices; hints were sufficient. Parts of vessels were disinfected after infectious diseases with 4·5 per cent. of formalin spray or with sulphur. A ship which had landed a case of yellow fever on May 8th at Barbados was fumigated on the same day, again on May 22nd at Norfolk, Virginia, and again at Hull on Sept. 8th, this time with formalin, so that no mosquito was likely to survive. No case of cholera, plague, or yellow fever was dealt with; 68 cases of venereal disease were found on board ships on arrival. It is being discussed whether the duty of killing rats above high-water mark falls on the city or on the port sanitary authority; meanwhile 11,333 were accounted for in 1926, 8810 of them from ships and 86 from trawlers. Ships from plague-infected ports are required to have rat-guards on their hawsers or to keep themselves three feet off the quay and to cover their hawsers with three feet of fresh tar. Traps are set on board, but not poison baits. Plague was never found among the 632 rats specially examined. There is risk in rat-catching, but overalls and gauntlets are worn, and the fleas on the dead rats are killed by immersion in paraffin. Forty-four vessels were fumigated and some seven rats killed on each. Three pounds of sulphur are burned per 1000 cubic feet, the time of exposure being six hours for the United States and eight for Australia. The port analyst examined 34 samples of water from ships and only 26 were satisfactory. Of the 8357 aliens who arrived, 7283 were transmigrants and were all clean; 259 were certified on account of trachoma, favus, and other infections. Food inspection at Hull is very important, covering 40 per cent. of the imports. Arsenic was found on apples that had been sprayed to prevent growth of the codling moth; it was almost exclusively external. Dealers were advised to brush the stalk and calyx before sale, when there would be no danger if the apples were peeled. The largest amount of arsenic was 0·023 grains per lb.; the amount considered safe is 0·01 gr. Four hundred tons of fruit was condemned and sent to the destructor; the small quantity of meat products condemned was commercially utilised. The report was largely compiled by Dr. E. J. Clark (assistant M.O.H.).

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 3RD, 1927.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 111 (last week 166); scarlet fever, 1461; diphtheria, 815; enteric fever, 104; pneumonia, 380; puerperal fever, 40; puerperal pyrexia, 93; cerebro-spinal fever, 4; acute poliomyelitis, 38; acute polio-encephalitis, 3; encephalitis lethargica, 35; continued fever, 1; dysentery, 6; and ophthalmia neonatorum, 92. No case of cholera, plague, or typhus fever was notified during the week.

Deaths.—In the aggregate of great towns, including London, there was 1 death from small-pox, 1 from enteric fever, 13 (1) from measles, 2 (1) from scarlet fever, 18 (5) from whooping-cough, 22 (1) from diphtheria, 52 (11) from diarrhœa and enteritis under two years, and 18 (2) from influenza. The figures in parentheses are those for London itself.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A fortnight's course in medicine, surgery, and the specialties will start at the Westminster Hospital on Sept. 19th. On the same date the Royal National Orthopædic Hospital begins a fortnight's course occupying the whole of each day. From Oct. 3rd to 15th a course in cardiology will be held at the National Hospital for Diseases of the Heart; the daily sessions will be from 10 A.M. to 4 P.M., and entries are strictly limited to 20. From Oct. 3rd, for three weeks, there will be a course at the Central London Throat, Nose, and Ear Hospital; it will be divided into two parts, which may be taken together or separately. The clinical course occupies all day from 9 A.M., whilst the operative surgery class (practical) lasts from 10 to 11.30 A.M. daily. There will also be a practical course in peroral endoscopy. The operative and endoscopy classes are strictly limited. Prof. Louise McIlroy will hold a course in antenatal work at the Royal Free Hospital on Fridays at 5 P.M. from Oct. 7th to 28th. It will be open to ten post-graduates only, and the fee will be £5 5s. At the same hospital, on Wednesdays, at 5.15 P.M., from Oct. 12th to Nov. 2nd, Dr. C. B. Heald will give lectures and demonstrations in electrotherapy. Other courses will be given at the Chelsea Hospital, the Royal Eye Hospital, the London School of Hygiene and Tropical Medicine, and the Paddington Green and Victoria Hospitals for Children. A two months' course in neurology at the National Hospital, Queen-square, also starts on Oct. 3rd, consisting of attendance at the afternoon clinics at the hospitals and certain special lectures. Copies of all syllabuses and of the general course programme are obtainable from the Secretary of the Fellowship at 1, Wimpole-street, London, W. 1, and will be sent regularly to applicants if desired.

Correspondence.

"Audi alteram partem."

POOR-LAW HOSPITALS.

To the Editor of THE LANCET.

SIR,—I read with great interest the excellent letter of Dr. H. J. Bailey in THE LANCET of Sept. 3rd last, concisely pointing out the value of the Poor-law hospitals as they are at present and the extremely important uses to which these institutions might be put. I wish to add a few comments.

As regards medical research, Dr. Bailey mentions the unique and varied material to be found at our large infirmaries. It seems to me that much extremely valuable information regarding certain forms of treatment and the results thereof could be obtained if the necessary statistics were collected from the infirmaries by some central authority such as the Ministry of Health. By this means the large number of cases necessary to obtain statistics of any value could be obtained in a very much shorter period than would be necessary were the cases collected, as is usual at present, by individual effort in voluntary hospitals.

A further point arises in connexion with the use of the Poor-law hospitals for teaching purposes. Would they not be extremely valuable, especially in some of the large provincial towns, for post-graduate instruction? The importance of post-graduate teaching is steadily being recognised, and if the Poor-law hospitals were used for this purpose it would give the post-graduate a teaching school apart from that of the undergraduate.

In order to attain the most efficient treatment of the sick the Poor-law hospitals should be assisted in their process of evolution, which has been very rapid of recent years. A sufficient and efficient medical staff must be provided, and, as Dr. Bailey points out, encouragement offered for work of a professional rather than of an administrative nature.

I am, Sir, yours faithfully,

G. P. B. HUDDY, M.S., F.R.C.S.

Dudley-road Hospital, Birmingham, Sept. 10th, 1927.

A CASE OF CEPHALIC TETANUS.

To the Editor of THE LANCET.

SIR,—The case of cephalic tetanus described by Dr. W. Fletcher and Dr. J. P. Fitzpatrick in THE LANCET of Sept. 10th is, of course, interesting. It had been more interesting had we been told of the treatment adopted. Antitoxin, magnesium sulphate, tracheotomy—any or all of these might have helped, and, with an incubation period of ten days, ought to have helped a little. This type of tetanus was described under the title of "Kopftetanus" in the last century, and was well known when I was a student. A case was described as occurring in Norwich in 1837.

I recall that on entering private practice in Sydney—now over 21 years ago—I saw, within a fortnight, two cases, both in stable-lads, and with an incubation of 14 and 12 days respectively. Both gave histories of facial abrasions, both evidenced facial paresis, and both had modified trismus. Thanks to the teaching of my late clinical lecturer, Dr. W. Camac Wilkinson, I immediately made a diagnosis and exhibited antitoxin; both recovered. An excellent account of this variation of classical tetanus, with many cases similar to that recorded by your contributors, and a full table of references, is to be found in Allbutt and Rolleston's "System of Medicine," 1911, Vol. I., pp. 1039 et seq.

Your contributors say that the condition is very uncommon; it is certainly very rare in any one man's experience, but East of Suez it should ever be in the medical mind.

I am, Sir, yours faithfully,

MACNEILL SIMPSON, M.B., M.Ch. Syd.

Hove, Sussex, Sept. 12th, 1927.

AN EXPLANATION OF THE FORMATION OF WHITE CLOT WITHIN ANEURYSMAL SACS.

To the Editor of THE LANCET.

SIR,—The origin of the white clot found in aneurysmal sacs has always been a mystery to me, and the explanations given in text-books have never been fully satisfactory. The explanations generally given is that the blood clots in the ordinary way and the corpuscles are subsequently dissolved out, leaving behind a white clot. One other explanation is that red blood corpuscles are whipped out of the blood by the force of the circulating blood. Regarding the disappearance of the red blood corpuscles from the clot there never has been reported an invasion of the clot by white blood corpuscles or other phagocytes. Another explanation given is that the red blood corpuscles are dissolved by a ferment, but there is no proof of this. Recently I performed an obliterative endoaneurysmoraphy of an ileofemoral aneurysm.

The patient was 55 years old, and the duration of the aneurysm was one month. The aneurysm was of the fusiform type, and the extent of the vessel affected was more than 2 inches. It was the size of an orange, and it pulsated violently. After controlling the common iliac and the external iliac on the same side transperitoneally, and the inferior epigastric in the abdominal wall, the aneurysm was incised. The time that elapsed between the control of the vessels and the opening of the sac was not more than five minutes. To my surprise, as soon as I incised the sac clear yellowish fluid escaped, followed by blood. The amount of this clear yellowish fluid I estimate was about between 3 to 4 oz. On further opening the sac I found that it was lined by a yellowish clot about one-eighth of an inch thick. This had quite a glistening appearance. The proximal opening was situated about one inch about the inguinal ligament, and the distal opening was at the bifurcation of the common femoral. The operation which followed was along the usual lines. The clear yellowish fluid that escaped I take to be blood plasma, and this was in contact with the sac wall, inasmuch as it escaped as soon as the sac was incised. Whenever this plasma clots, from whatever cause, it will necessarily produce a yellowish clot.

While talking about this case a colleague mentioned that he had seen a gluteal aneurysm opened under the impression that it was an abscess. In that case also clear fluid escaped first, and blood spurted out afterwards. Surgical aneurysms are not common in Bombay, this being the only case I have had during three years. I should like to know whether such clear fluid has been seen to escape on incising aneurysms in the living subject.

The origin of the plasma in the aneurysmal sac may be explained as follows. The pulsation of an aneurysm is admittedly due to ventricular contraction. During each diastole the aneurysm shrinks, and during each systole it expands. During the diastole the aneurysm does not completely empty itself; there is still a fair amount of blood left in the sac. Each systole adds to this, and during diastole this added portion escapes back into the artery by the elastic recoil of the aneurysmal sac and its surroundings. The portion of the blood contained within the sac most affected by the entry and the exit of blood, therefore, is that portion which lies towards the centre of the sac and near the opening in the arterial wall. The portion of blood lying in contact with the sac wall, and also a portion of variable depth from it—namely, that portion of blood which is contained in the sac at the commencement of systole—is merely pushed back and forth by the ingoing and outgoing blood. Naturally the portion that is next to the opening will be affected more than that portion which is lying against the sac wall. This blood has only back and forth movement; a certain amount of churning probably occurs in the central portions. For practical purposes, then, this blood is out of the circulation; the nearer we approach the sac wall the more it is so. The blood is stagnating with only a back and forth movement; in stagnant blood which is not in an easily coagulable condition the corpuscles tend to settle down; the back and forth

movement may even help this settling down owing to the inertia of the corpuscles; after the corpuscles have settled down plasma alone is left, and this plasma shall be more free of corpuscles the nearer it is to the sac wall; it was this plasma which I saw escape from the aneurysm as soon as I incised it and the pale yellow clot found on the wall of the aneurysm sac was derived from this plasma.

I have had diagrams made which illustrate roughly what I think happens within the sac. One shows how the motion diminishes from the centre to the periphery, the short undulations showing marked movement, and longer undulations showing less and less movement of a churning or mixing character. Another shows the condition of the contained blood. My friend, Dr. V. N. Shirodker, kindly drew the diagrams. I am, Sir, yours faithfully,

Bombay, August 20th, 1927. S. R. MOOLGAVKAR.

*** The diagrams were too rough for reproduction, but in essentials illustrate the theory.—ED. L.

REGULAR MEDICAL EXAMINATION.

To the Editor of THE LANCET.

SIR,—The outstanding success of the modern practice of medicine is in the direction of preventive measures based on a wider knowledge of the natural history of disease. This is far more evident in the case of the public health services than in the everyday relation between the individual citizen and the practising physician, even though in the former case the new knowledge is being but imperfectly utilised.

The public continue to regard the doctor as one who heals rather than as one who teaches, and to seek his aid in times of trouble.

We suggest that the great insurance companies, or some other organisation in this country, might help to remedy the deplorable state of the public mind in this respect by arranging regular medical examination facilities for families. A start has been made by prominent insurance companies in the United States (and in our own country by two leading offices), who arrange for the free periodic examination of their policy-holders and thereby encourage the individual to seek at regular intervals medical instruction on the preservation of his health and so provide an invaluable opportunity for the discovery of any early signs of bodily disorder. In 14 years, as the result of regular medical examination, the extension of life amongst its policy-holders has been increased by the Metropolitan Life Insurance Company of New York by nine years, compared with four and a half years among the general population. Defects in habits of living were found in 99 per cent. of those examined.

But since, as a rule, only the adult male members take out life policies, provision requires to be made for the examination of the mothers, adult females, and children.

Such a policy might also cover, above an agreed figure, special medical and surgical expenses incurred by the family. There is a very large family class to whom the expense of expert medical services is very crippling and often prohibitive. Such investigation, advice, and treatment would thus be secured in the early stages of disease. The usual course adopted is to seek such aid as a last resort—generally too late to be of any use.

It would serve also to encourage timely visits to the family practitioner, who is too often called in only when the malady is well established.

We have the honour to be, Sir, yours truly,

WILLIAM MILLIGAN, M.D., J.P.
A. ENGLAND, C.M.G., D.S.O., M.P. (Colonel).
LEONARD WILLIAMS, M.D.
S. H. BELFRAGE, M.D.
ELIZ. M. SLOAN CHESSER, M.D.
IVO GEIKIE COBB, M.D.
B. B. ORMEROD,
(Director, Family Medical Services, Ltd.),

1, Princess-street, Manchester (temporary address), Sept. 10th, 1927.

THE VITAL STATISTICS OF 1926.

THE Registrar-General's review,[1] as is well known, is now issued in three volumes. While this makes for convenience in handling, it involves the awkward necessity for references when Part III. containing the explanatory text appears. The volume here reviewed is Part II., which deals with the chief crude figures relating to population, to marriages and births, deaths being dealt with in Part I. Part II. gives also marriage-rates, birth-rates, death-rates, and infant mortality-rates for each administrative area One table (14 in Part I. and E in Part II.) deals with these matters jointly, and is for convenience printed in both parts. Thus Part II. deals with deaths, but is not the part to be consulted as to deaths. Further medical statistics are given in Part I. already published, and the important text dealing with these and allied matters may be expected later.

The outstanding feature of the vital statistics is the continuing decline of the natural birth-rate. Apart from war years, it was in 1926 the lowest on record, and in fact has now fallen to the war level of 17·8 per 1000 of population. This reduction in the birth-rate has now reached a stage at which the actual number of births in England and Wales is as small as in the year 1860 when the population was only one-half of its present magnitude. This striking reduction in births, which this country shares with many other Western countries, is the most outstanding feature of the social history of the people. It is on a magnitude which is only compensated for to a minor degree by the low general death-rate and the remarkably low rate of infant mortality. The general death-rate was 11·7 per 1000 of population, while the infant deaths per 1000 births were 70.

In preceding comments[2] on our national statistics we have drawn attention to the relatively unfavourable statistics of the north of England, where, for instance, the infant mortality-rate in 1926 was 84, and in Wales 71, as compared with 64 in the Midlands and 58 in the south of England. The explanation of this difference is not to be found chiefly in climatic or in industrial conditions, but more in a lower standard of housing and of methods of life generally. In the rural districts of the north a similar difference is manifest, the infant death-rate in the rural districts of the north being 72, as compared with 50 in the south. We note among the individual sanitary districts in which the infant death-rate was exceptionally high the following: Wokingham 133, Linsdale 138, Hoole 155, St. Ives 140, Harrington 131, Alvaston 167, Newent 118, Lydd 173, Abram 131, Hindley 138, Rainford 172, Trawden 139, Worsley 129. The list might be extended easily, and in regard to some of those named above the data on which the mortality-rates have been calculated are scanty. But making due allowance for this, and remembering the need in each instance to ascertain the death-rates for each area in other years, it is evident that vast differences in infant mortality continue, and that the scope of child welfare work is far from exhausted.

[1] The Registrar-General's Statistical Review of England and Wales for the Year 1926. Tables, Part II., Civil. H.M. Stationery Office. 5s.

[2] THE LANCET, August 13th, p. 348.

SEVENOAKS HOSPITAL.—Sir Charles Wakefield, who was a passenger in the train which recently met with disaster at Sevenoaks, has given £1000 to the Sevenoaks and Holmesdale Hospitals, "in recognition of the great services rendered by the medical and receiving staff to the unfortunate victims of the accident."

LONDON HOSPITAL.—Through the generosity of Sir Harry Mallaby-Deeley a new massage and electrical department is to be erected at the London Hospital at an estimated cost of £13,500. Unlike St. Thomas's and St. Bartholomew's, the London Hospital has no coat-of-arms and the committee feel that this must be rectified in view of the importance of the institution.

Obituary.

WILLIAM THELWALL THOMAS, M.B.E., CH.M. LIVERP., F.R.C.S. ENG.

Mr. Thelwall Thomas, who died suddenly at his home near Liverpool on Sept. 10th, was a surgeon of unusual ability whose talents were used generously on behalf of his patients and his colleagues. On the General Medical Council he represented the University of Liverpool, where he was for many years professor of regional surgery, and his recent re-election to the Council of the Royal College of Surgeons of England testified again to the esteem in which he was held by the profession.

Born at Liverpool in 1865, William Thelwall Thomas was educated at the Liverpool Institute and

MR. THELWALL THOMAS.

[Photograph by Elliott and Fry, Ltd.

studied medicine at Glasgow Royal Infirmary and University College, Liverpool. Even as a student his ability was outstanding and at Liverpool he was singled out by Sir William Mitchell Banks to assist him as demonstrator of anatomy. Qualifying in 1886, he served for a time as assistant to a practitioner in Wales, and it was then his intention to enter general practice; but after resident appointments at Liverpool Royal Infirmary he reversed this decision in favour of a surgical career, for surgery at this time was making great advances, and his natural bent was towards operative work. He was elected Holt Scholar in anatomy at University College, Liverpool, in 1887, and shortly afterwards became assistant lecturer and demonstrator in anatomy in the University. In 1890 he took the Fellowship of the Royal College of Surgeons and settled down as a consultant in Hope-street, not attempting to combine surgical work with general practice as was generally done by his contemporaries in the North of England. It was not long before his skill began to win the confidence of medical men in the city. Elected assistant surgeon to the Royal Infirmary in 1892, he soon distinguished himself as a rapid and resourceful operator and as a sound diagnostician, and these qualities, together with tremendous industry and unfailing optimism, brought him eventually one of the largest surgical practices in the provinces. This well-merited success sprang also from his competence as a teacher. Starting at Liverpool at a time when the few surgeons of the city spent almost all their time in private work, Thelwall Thomas early took a prominent place in the work of the medical school. At first he taught many subjects; later, as the school developed, the field of his activities narrowed. From being lecturer in practical surgery he was in 1913 appointed professor of regional surgery in the University, and on retiring from this chair in 1922 became emeritus professor. As a teacher, he was both admired and liked. His manner was direct and genial and his relations with students were always friendly.

In 1907 Mr. Thomas became full surgeon to the Royal Infirmary, and he retired from the hospital staff as consulting surgeon only two years ago. In 1909 he was given the honorary degree of Master of Surgery by the University, and when the British Medical Association went to Liverpool in 1912 he was appointed general secretary of the meeting, presiding over the Section of Surgery in the following year when the Association met at Brighton. In 1921 he was elected a Councillor of the Royal College of Surgeons of England, and at the beginning of last year he succeeded to the late Dr. Richard Caton's seat on the General Medical Council. With Sir Berkeley Moynihan, Sir Robert Jones, and Sir Harold Stiles, Thelwall Thomas was one of the founders of the Chirurgical Club, whose excellent object was to travel and see the work of other surgeons. Especially as an example, this club has borne much good fruit. He was a writer on many topics, including hospital administration and finance, and continued his contributions to the literature of surgery over many years. During 1918–19 he held office as President of the Liverpool Medical Institution.

We have received the following appreciation from Mr. Frank Jeans:—

"Thelwall Thomas was above all the doctors' surgeon. He used to say he was the first in Liverpool to 'toe the line.' This meant that in the transition period, when Liverpool was to change from being a large town in which one or two men with a reputation for surgery could in addition to general work carry the surgery of the town and half a dozen counties on their backs, to being a big centre of medical education which could support its pure consultants by the dozen, Thelwall Thomas by his courage and acumen gave the impetus. He had an exceptional chance but it is only fair to say that he had more—the exceptional ability to seize it and thus become for an allotted span the leading surgeon of the city. He was delightful to students and very human to patients, and his sincerity made an acquired bedside manner unnecessary. He said his certainty of diagnosis was acquired by the coaching he had to do in his early days in order to enter the ranks of the consultants. He certainly realised that dogmatism was practically a necessity in a consultant who is called in to decide. And the tremendous faith instilled into his patients was because he was so sure of himself. He was an illustration of Bland-Sutton's view that most good surgeons are quick. Thomas was both quick at making up his mind, which was volcanic in its power of seeing the kernel of any question and quick in executive and operative power. Brimful of energy and with an immense capacity for work his services in holding the medical school together during the war were perhaps not fully appreciated. Only a serious illness just before the war prevented him from going overseas.

"When one has known a man as a teacher, colleague, and a friend for a quarter of a century it is difficult to separate one's affection for the man from one's admiration for him as an artist, but of the two surgeons who were privileged to be associated with him as juniors neither will yield to the other in admiration of Thelwall Thomas as a chief. He died

as he would have wished and as he had lived and worked—quickly. He had few hobbies except of an intellectual and indoor nature, and as his main interest was surgery one wondered what he would do if ever, as seemed unlikely, he were to retire. The problem has been solved by a higher and perhaps kindlier hand."

Mr. Thomas married Miss Anabel Spence, daughter of the late Mr. Alexander Spence, of Aberdeen. She died two months ago after a long illness, and there is no family.

JOHN JOHNSTON, M.D. EDIN.

THE death is announced from Blackpool of Dr. John Johnston, who was for many years a practitioner in Bolton and was at one time president of the Bolton and District Medical Society. Born at Annan in Dumfriesshire 74 years ago, he got his early schooling at the Annan Academy and then went on to the University of Edinburgh, where he graduated in 1874. In the same year he was appointed house surgeon to the West Bromwich District Hospital, and after a further period as resident medical officer at the Birmingham and Midland Hospital for Sick Children, proceeded to the M.D. degree with honours and settled in Bolton. Here he soon had a large practice; he joined the honorary staff of the Bolton Infirmary and was widely recognised as a capable surgeon. Outside his medical work he directed his attention especially to the training of railwaymen in ambulance work, and the usefulness of his teaching was recognised by his being made an honorary associate of the Order of St. John of Jerusalem with the award of a gold medal for long service. In addition, Dr. Johnston held the King George Coronation Medal and a special badge given in recognition of two years' war service as medical officer at Queen Mary's Military Hospital, Whalley, and two years service at Townleys Hospitals, Bolton. Nine years ago he gave up practice and went to live in retirement at Bispham, Blackpool. He was now able to give more time to the literary work which had largely filled his leisure for many years, and he was elected president of the Blackpool Literary and Scientific Society. Amongst his works, which are chiefly poetical, is one describing a visit which he paid to Walt Whitman in 1890. He also wrote accounts of travels in Egypt and Palestine. A memorial service to Dr. Johnston was held at Blackpool on Sept. 5th, and he was buried at Annan on the following day. He leaves a widow.

CUTHBERT CHAPMAN GIBBES, M.D. ABERD., M.R.C.P. LOND., D.P.H.

THE death is announced on August 24th of Dr. G. C. Gibbes, consulting physician to the National Hospital for Diseases of the Heart, at the age of 77. He was the son of Heneage Gibbes, M.D., and received his education at Wimborne Grammar School, the University of Aberdeen, and Westminster Hospital. As soon as he had taken a medical degree he went out to Jamaica for a year as resident medical officer of Kingston Hospital, and on returning to England he took up a similar appointment at the East Devon and South Cornwall Hospital. During the years that followed he gained wide experience as surgeon to the London and South-Western Railway, medical superintendent of Tolworth Hospital for Infectious Diseases, and clinical assistant at Brompton Hospital. On joining the medical staff of the National Hospital in 1897 he set up in consultant practice in London and contributed numerous papers on cardiology to medical journals, including an account of collective investigations of 11,000 recruits with doubtful cardiac conditions. After the war he was appointed consulting cardiologist to the Ministry of Pensions for East Hampshire and the Isle of Wight. Dr. Gibbes's principal recreation was botany, and he was a Fellow of both the Linnean Society and the Chemical Society.

WILLIAM DAVID ADAMS, M.B., C.M. EDIN.

Dr. W. D. Adams, who died on August 28th, was a well-known practitioner in South Norfolk and was medical officer for the Kenninghall district, and for the Thetford and Wayland Unions. Fifty-eight years of age, he was the son of the Rev. David Laird Adams, professor of Hebrew and Oriental languages in the University of Edinburgh. He was educated at George Watson's College, Edinburgh, and after taking an Arts degree at the University, began the study of medicine, winning the Thomson Bursary. On graduation in 1894 he passed into the Navy and served for several years at Haslar and at sea, but in 1899 he left the Service and settled in private practice at Kenninghall. Dr. Adams married the daughter of Mr. P. K. Blofield, of Quidenham, and she survives him with three daughters and a son. His brother is Dr. H. F. W. Adams, of Cirencester.

EDITH NEILD, M.B. LOND., L.R.C.P. EDIN.

Miss Edith Neild died on August 29th at Hartfield after a long period of poor health. Born at Plymouth 53 years ago, she was the eldest daughter of the late Dr. Frederick Neild, and went to Tunbridge Wells with her parents at an early age. She received her medical education at the School of Medicine for Women at Edinburgh and qualified in 1898. For a time she was connected with the London Homœopathic Hospital, but later returned to Tunbridge Wells to help with her father's practice. It was not long, however, before she acquired a practice of her own, and her services were greatly in demand. Like her father, Dr. Neild was a member of the Society of Friends and was known to a large circle outside her own neighbourhood. Her character commanded both respect and affection, and her retirement last June was greatly regretted. For over 26 years she was physician to the Tunbridge Wells Homœopathic Hospital.

Medical News.

OPENING OF THE MEDICAL SCHOOLS: ANNUAL DINNERS.—The following arrangements are announced by medical schools in London:—

London Hospital.—The Old Students' Dinner will be held at the Trocadero Restaurant, Piccadilly Circus, London, on Thursday, Oct. 20th at 7.30 for 8 P.M. Dr. Angus Kennedy will take the chair.

St. Bartholomew's Hospital.—The Old Students' Annual Dinner will be held on Monday, Oct. 3rd, at 7 for 7.30 P.M., in the Great Hall of the Hospital. Dr. Morley Fletcher will take the chair.

St. George's Hospital.—Sir Humphry Rolleston will deliver the introductory address at the hospital on Oct. 1st.

St. Mary's Hospital.—The annual dinner of past and present students will be held at the Connaught Rooms, Great Queen-street, on Saturday, Oct. 1st, at 7 P.M.

St. Thomas's Hospital.—The annual dinner of old students will be held on Friday, Oct. 28th, at 7.30 for 8 P.M., at the hospital. Sir Charles Ballance will preside.

Middlesex Hospital Medical School.—The winter session will open on Tuesday, Oct. 4th. An introductory address entitled the Paths to the Stars, will be delivered at 3 P.M. at the Queen's Hall by Mr. Victor Bonney, after which the prizes gained during the previous year will be distributed by Sir Charles Sargant, Lord Justice of Appeal.—The annual dinner will be held the same evening at 7 for 7.30 P.M., at the Savoy Hotel (Embankment entrance). Mr. Somerville Hastings will take the chair. Those wishing to be present at the dinner should communicate as soon as possible with the Secretary to the Council of the Medical School.

University College Hospital.—The annual dinner of past and present students will be held on Friday, Oct. 14th, at 7 P.M., at the Hotel Cecil. Sir George Blacker will take the chair.

Westminster Hospital Medical School.—The inaugural address will be given in the Board Room of the hospital on Monday, Oct. 3rd, at 3 P.M., by Dr. E. W. Ainley Walker,

Dean of the School of Medicine, University of Oxford.—The annual dinner of past and present students will be held at the Royal Adelaide Gallery, Gatti's Restaurant, Strand, on Saturday, Oct. 1st, at 7 P.M. Dr. de Souza will preside.

THE Lister Centenary Exhibition at the Wellcome Historical Medical Museum, 54A, Wigmore-street, will be closed on Oct. 1st. The Museum is open to visitors as follows: Monday to Friday, from 9.30 to 5.30; Saturdays, 9.30 to 1; Sundays, closed.

CONFERENCE OF GAS INDUSTRY.—Sir Russell Bencraft, M.R.C.S., will preside over the sixteenth annual conference of the British Commercial Gas Association, which will be held at Southampton from Oct. 3rd to 5th. Sir Bruce Bruce-Porter, M.D., will give an address entitled New Health: The Importance of Health in Industry.

HEALTH WEEK.—This year Health Week will be celebrated from Oct. 2nd to 8th, its object being to bring home to every man and woman in this country the importance of health and their personal responsibility for safeguarding it. The dominant idea will be "Self Help in Health." Particulars may be had from the Secretary of the Royal Sanitary Institute at 90, Buckingham Palace-road, London, S.W. 1.

SOCIETY OF APOTHECARIES OF LONDON.—The Court of Assistants has adopted the report of the Examinations Committee recommending the institution of a diploma indicating specialised knowledge of the subjects of antenatal care, midwifery, and infant welfare, and steps are being taken to institute the examinations at an early date. They will be open to registered medical practitioners, and further particulars will be published later.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—In the Michaelmas term courses of lectures will be given by Prof. Alexander on Value (Truth, Goodness, Beauty); by Mr. John Hobson on Economics in Relation to Ethics; by Prof. Leonard Russell on the Approach to Philosophy; by Mr. S. E. Hooper (Director of Studies) on the Introduction to Philosophy; and by Dr. William Brown on Psychology. In the Lent term Mr. Bertrand Russell will lecture on the Philosophy of Physics and Dr. Morris Ginsberg on Social Psychology. In the summer term Prof. Clement Webb will give a course of four lectures on the Philosophy of Religion, and Prof. C. Lloyd Morgan a course of six lectures on Mind in Nature. A full syllabus can be had from the Director of Studies, 88, Kingsway, London, W.C. 2.

Appointments.

BELAM, F. A., M.D. Liverp., D.P.H., has been appointed Medical Officer of Health for Guildford Borough and Guildford Rural District, and Medical Officer to the Guildford, Godalming, and Woking Joint Hospital Board.

KING, P. A. H., M.B., Ch.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Holt District of the county of Norfolk.

Vacancies.

For further information refer to the advertisement columns.

Alton, Hants, Lord Mayor Treloar Cripples' Hospital.—2nd Asst. Res. M.O. £300.

Brighton, New Sussex Hospital, Windlesham-road.—H.S. £50.

Brighton, Royal Sussex County Hospital.—H.S. £150. Also Hon. Surg. Clin. Asst., Hon. Clin. Asst. to Ophth. Dept., and Hon. Med. Clin. Asst.

Bristol Education Committee.—Asst. Sch. M.O. £600.

Cambridge, Addenbrooke's Hospital.—Cas. O. and Res. Anæs. At rate of £130.

Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.—Sen. and Jun. H.S.'s. At rate of £100 and £50 respectively.

Dumfries, Crichton Royal Mental Hospital.—Asst. P. £350.

Dundee Royal Infirmary.—Asst. S.

Evelina Hospital for Children, Southwark, S.E.—Two H.P.'s. Each at rate of £120.

Freetown, Sierra Leone, Liverpool School of Tropical Medicine Laboratory.—Two Research Assts. Each £600.

Halifax Royal Infirmary.—Third H.S. At rate of £100.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S., H.P., and Asst. Cas. O. Each £50.

Ipswich, East Suffolk and Ipswich Hospital.—Pathologist. £650.

Jersey General Hospital and Poor-Law Infirmary.—Res. M.O. £200.

King's College Hospital, Denmark Hill, S.E.—Clin. Assts., Sen. Med. and Surg. Registrars and Sambrooke Med., &c., Reg.

Leeds City.—Asst. Clin. Tuberculosis O. £600.

London Hospital, E.—Asst. P. Also 1st Asst. and Reg. to one of the Med. Firms, and 1st Asst. and Reg. to one of the five Surg. Firms. Each £300.

London Jewish Hospital, Stepney Green, E.—Hon. M.O. for Dept. for Dis. of Skin. Also Hon. Asst. S. for Dis. of Eye.

Macclesfield, Parkside Mental Hospital.—Res. Clin. Asst. £75.

Manor House Hospital, Golders Green, N.W.—H.S. At rate of £200.

Middlesex Hospital Medical School, London, W.—2nd Demonstrator for the Dept. of Physiology.

Miller General Hospital for South-East London, Greenwich-road, S.E.—H.P. £125.

Mount Vernon Hospital, Northwood, Middlesex.—Anæsthetist.

Newcastle-upon-Tyne Hospital for Sick Children.—Jun. H.S. At rate of £100.

Otago University and Dunedin Hospital, New Zealand.—Sen. Res. Surg. O. £500.

Oxford, Wingfield Orthopædic Hospital.—Res. Surg. O. and H.S. At rate of £200 and £150 respectively.

Prince of Wales's General Hospital, Tottenham, N.—H.S.'s and H.P.'s. At rate of £120 and £90 respectively.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—Two H.P.'s. Each at rate of £100.

Rotherham Hospital.—H.P. £180.

Royal Northern Hospital, Holloway, N.—Anæsthetist. £10 10s.

Royal Westminster Ophthalmic Hospital, King William-street, W.C.—Asst. H.S.

St. Albans, Herts, County Mental Hospital, Hill End.—Pathologist and Asst. M.O. £150–£500.

St. George's Hospital, S.W.—Asst. Radiologist. £100.

St. Mary, Islington, Infirmary, Highgate Hill, N.—Asst. M.O. At rate of £350.

St. Marylebone General Dispensary, 30, Marylebone-lane, W.—Hon. S. to Ear, Nose, and Throat Dept.

Samaritan Free Hospital for Women, Marylebone-road, N.W.—Anæsthetist. £30.

Seamen's Hospital, Albert Dock, Connaught-road, E.—Ophthalmologist.

Sheffield, Jessop Hospital (Firth) Auxiliary.—Res. M.O £175.

Smethwick County Borough.—Asst. M.O. and Sch. M.O. £600.

South Shields, Horton Poor-Law Institution and Cleadon Children's Homes.—Asst. Res. M.O. £300.

Stoke-on-Trent, North Staffordshire Royal Infirmary, Hartshill.—H.S. £150.

Walthamstow, Wanstead, and Leyton Children's and General Hospital.—Sen. and Jun. Res. H.S.'s. At rate of £150 and £100 respectively.

Watford, Peace Memorial Hospital.—Res. M.O. At rate of £150.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. and Jun. Non.-Res. H.S.'s. At rate of £150 and £100 respectively.

Westminster Hospital Medical School.—University Readership in Pathology. £800.

Willesden General Hospital.—H.S. At rate of £100.

Woolwich and District War Memorial Hospital, Shooter's Hill, S.E.—Hon. Visiting Obstet. S.

The Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act for the districts of the Bishop's Waltham, Petersfield, Portsmouth, and Newport and Ryde County Courts (Circuit No. 51). Applications should reach the Private Secretary, Home Office, not later than Oct. 1st.

Births, Marriages, and Deaths.

BIRTHS.

LING.—On Sept. 7th, at Welbeck-street, W., the wife of Dr. W. H. G. Mackwood Ling, of Keighley, Yorkshire, of a son.

MARRIAGES.

CRAWFORD—SCOULAR.—On Monday, Sept. 5th, at Camphill U.F. Church, Glasgow, James Paterson Crawford, M.D., F.R.F.P.S. Glasg., of Wimbledon, Surrey, to Margaret Muriel, only daughter of Mr. and Mrs. Gavin Scoular, Kilmarnock.

MCCREDIE—GRAY.—On Sept. 7th, at St. Martin-in-the-Fields, London, Peter A. McCredie, M.B., Ch.B., F.R.C.S. Edin., to Rosa Constance, elder daughter of Mr. and Mrs. W. J. Gray, Sedlescombe-road, St. Leonards-on-Sea.

DEATHS.

COX.—On Sept. 7th, at Arden, Cavendish-road, Bowdon, Cheshire, Frederick John William Cox, M.D., in his 70th year.

GLYN-JONES.—On Sept. 9th, at Vancouver, B.C., of cerebral hæmorrhage, Sir William Glyn-Jones, of Gordon-square, W.C.

IVENS.—On Sept. 11th, at Preston-drove, Brighton, Arthur Somers Ivens, M.R.C.S., L.R.C.P., late of Thorpe-le-Soken.

MACVICKER.—On August 30th, at a nursing home in Clifton, of blood poisoning contracted while attending to a patient, Charles George MacVicker, J.P., B.A., M.B., B.Ch., the dearly loved husband of Marian Churchill MacVicker, of Street, Somerset, aged 64.

MORRIS.—On Sept. 6th, Lionel Frederick Morris, L.D.S. R.C.S. Eng.

REYNOLDS.—On Sept. 9th, 1927, at White Lodge, Monken Hadley, Barnet, after a brief illness, Bryan Ellis Reynolds, M.B. Lond., M.R.C.S. Eng., son of the late Edward R. B. Reynolds, M.R.C.S. Eng.

THOMAS.—On Sept. 10th, at Verdala Tower, Allerton, Liverpool, William Thelwall Thomas, F.R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

POINTS SUGGESTED BY RECENT INVESTIGATIONS INTO THE LATE RESULTS OF TREATMENT OF BREAST CANCER.

BY GRETTA M. WARDLE, M.B., CH.B. LEEDS.

IT is of interest and importance to analyse the reasons for the continued high mortality from cancer, in spite of increased facilities for early diagnosis and extensive operative treatment, and to try to estimate whether, as a result of intensive measures to combat it, there is any improvement, even though slight. For such an analysis it is best to take a form of cancer in which early diagnosis and radical treatment hold out some chance of permanent cure, or at any rate, considerable prolongation of life; and cancer of the breast is, in this respect, a favourable form. It is external, should be early noticeable by the patient, is easy of access operatively, and thus is one of the few situations in the body where cancer can be attacked in its early stages, that is, while it is still essentially a local disease.

The following remarks were suggested by a study of the after-histories of breast cancer cases operated on in Manchester and Leeds hospitals. Over 850 cases were dealt with in the course of the investigation, including 200 by Dr. J. Murray, of the Manchester Cancer Committee, nearly all the living patients were questioned and examined personally, while the relatives and friends of those who had not survived were in most instances interrogated.

The Information Required.

The information which is wanted for an exhaustive analysis is as follows:—

1. How many people actually die of cancer of the breast?

2. How many cases dying from cancer of the breast are operated upon? A large number of cases apply for treatment only at a hopelessly late date, or perhaps never at all.

3. Why every case is not operated on? Every case (excluding those in which there is gross intercurrent organic disease) has an operable stage.

At the present time it is only possible to obtain approximate data for the first two points given above. If accurate figures could be obtained, the value of statistical inquiries into the results of treatment of breast cancer would be greatly enhanced. Moreover, propaganda should do much to lessen the number of inoperable cases, and it would be of value if its influence could be shown by a definite numerical reduction. Many sources of inquiry would have to be tapped for such an accurate survey of cancer cases, and the coöperation of all branches of the medical profession would be essential.

Deaths from Cancer of the Breast.—We want to know, in a given year, how many of the population, say, of a large town die from cancer of the breast, or are suffering from it at the time of death. This would be easy if every case so dying was certified as dying of cancer, but the real cause of death does not always appear for various reasons, though the tendency nowadays is certainly much more towards frankness where cancer is concerned than it was some 50 years ago. Thus the first essential would be an attempt to get the general practitioner to certify cancer whenever possible, and in cases where he thinks that for some important reason it is inadvisable to certify that the case was one of cancer, he might be requested to notify the condition (in strict confidence without giving the patient's name) to the public health authority. The annual incidence of cancer of the breast would really be of greater value than the mortality, but this could only be obtained by compulsory notification, which at present appears to be out of the question.

Cases Operated On.—Secondly, we want to know how many of those dying of cancer of the breast were operated on, and when. This information could always be shown on the death certificate—e.g., "Operation, two years and eight months," or "No operation," as the case might be. This is sometimes done now. There would be inevitable difficulty in obtaining the reason for no operation. One can only hope that the practitioner would be willing to supply the information when approached by the responsible authority.

There are many difficulties also in obtaining an exact return of all cases operated on in a city. Operations may take place in:—1. Voluntary hospitals: to these it is possible to have access for record taking. 2. Poor-law hospitals: to these also access could be obtained. 3. Nursing homes: in these are the private cases, the records of which can only be made by the surgeons themselves; it might be feasible, in a matter of public welfare, to ask them to take a note of the number of breast cases upon which they operate. 4. Some cases are operated upon by general practitioners in the early stages, usually under the impression that the case is one of non-malignant growth. 5. A number of residents may go to another town for operation, but this leakage should be small. 6. A small number may have been operated upon previous to settling in the town; these will appear as operated cases in the death returns.

There are thus six channels through which patients suffering from cancer of the breast may pass for treatment, and if we could command all sources of information the following data could be amalgamated and, in time, reviewed *qua* the results of treatment and propaganda: (1) the total incidence of cancer of the breast; (2) the reduction of the inevitable mortality in untreated cases by operation; (3) the proportion of cases operated on, showing to what extent advantage was being taken of the facilities available.

The Determination of the Effect of Propaganda: Ignorance of the Laity.

If a more ambitious result were aimed at, such as the determination of the effect of propaganda on the general public and on practitioners, the review would have to extend over some years. It would be interesting to gauge more accurately (1) the effect of propaganda on the general public in inducing them to consult a doctor at an earlier date than hitherto; and (2) the effect of urging the general practitioner to suspect cancer at the very beginning, and to send patients for a confirmatory opinion or operation without delay.

I was amazed to see, in the course of recent investigations undertaken, the amount of ignorance which the laity still display over cancer. The old idea that it is a local manifestation of a general systemic disease persists widely. The idea that a painless condition cannot be cancer is very general. It is widely believed that lumps in the breast can be removed by external applications; hence the valuable time lost by the patient trying various remedies on her own initiative or at the suggestion of a herbalist. There is also a belief that any lump or swelling in the breast occurring about the menopause is a natural accompaniment of that event, and will disappear after a while along with the other signs and symptoms. The dread of cancer and the conviction that it is incurable at any stage and by any means is the most difficult point to combat, because it seems to spring from a definite psychological outlook. Many patients know from the very first that there is something wrong with the breast, which instinct tells them is cancer, but they refuse to see a doctor because they dread having their fears confirmed. Some patients even admit that they have never palpated the breast because they knew from external appearances that something was wrong, but they could not bring themselves to confirm their worst fears by feeling for a lump. This type of mental outlook occurs in the better educated of the hospital class of patient (such as dressmakers, artisans' wives, shop assistants). It would appear that the women of the lowest class neglect to seek treatment through ignorance or carelessness rather than through fear.

The Dangers of Expectant Treatment: Inadequate Surgery.

Instances are still met with where the doctor, thinking that the tumour is simple, a hyperplasia (chronic mastitis) perhaps, but bearing in mind the possibility of cancer, orders expectant treatment, and tells the patients to come up again in three or six months' time. The patient, thinking that the condition is not serious, does not return as instructed, but only after a longer period has elapsed, and then with an advanced growth. The clinical diagnosis of early cancer as opposed to hyperplastic conditions is admittedly almost impossible even for those who have great experience in such cases. Histological examination may reveal a focus of cancer in the seat of hyperplasia. So, if a tumour of the breast is really thought to be innocent, it should be removed widely and examined, and the patient sent to hospital at once if the growth is reported malignant. Judging from some few instances met with in my recent investigations, the medical man may not have had his clinical diagnosis confirmed or refuted after he has removed a breast tumour, with the consequence that a growth recurs at the original site, and by now, probably involves the axillary glands as well, so that a case "favourable" at the outset is turned into a hopeless one. One might even go a step further, and urge that no practitioner without considerable surgical experience should operate on any breast tumour, however simple it may appear clinically, in any woman over the age of 35.

The rule formulated by the Johns Hopkins Hospital is worth bearing in mind—that of all tumours of the breast occurring in women over 35, 75 per cent. are malignant. For the sake of the 75 malignant, the 25 benign should be dealt with only by an experienced hand.

An entirely different attitude must be adopted towards clinically benign tumours in the breast of a woman of 45 than would be adopted towards a similar condition in the breast of a girl of 21. In the investigations of Leeds and Manchester cases it was found that 72 per cent. of the cases which could be definitely classified, had secondaries in the axilla at the time of operation. The universal aim must be to reverse these figures, so that at least 72 per cent. present themselves for operation at the stage when the disease is still confined to the breast. Improvement in the numbers of early cases operated on must be effected primarily by the patients themselves and, to a lesser extent, by the practitioners. In this way the general results of treatment can be definitely improved.

Results of Early Operation.

As a further encouragement to our efforts, I may briefly state here the results of treatment as determined in a recent investigation made by the Manchester Committee on Cancer, the facilities for which were kindly granted by the honorary staff and management of the Royal Infirmary, Manchester. The after-histories of 375 patients operated on for proved cancer of the breast were inquired into, and it was found that of the cases operated on when the disease was still confined to the breast, 72 per cent. are alive at the end of ten years; if cases dying of other causes than cancer are deducted, the survivors number 80 per cent. But of those cases operated on at a stage when the disease has invaded the lymphatic glands, the percentage alive at the end of ten years is only 15. The significance of these findings needs no comment.

THE STANDING NURSE.

To the Editor of THE LANCET.

SIR,—Medical men are aware of the ill-effects of standing at work. Why then, may one ask, are nurses kept perpetually on their feet when so often they might do their work better sitting? For instance, during the application of light to a lupus patch, where accuracy of application is as necessary as that it should be continuous for two consecutive hours, why should the nurse, even in quite swagger homes, be expected to do this work standing beside a couch? Where is the sense of it?

I am led to make these observations by the fact that one of the worst cases of varicose veins in the legs I have seen was in an elderly woman who had been a nurse.

The medical profession—and in this I would include such people as matrons—should lead in these matters and be an example to employers of labour.

I am, Sir, yours faithfully,

T. F. G. MAYER, M.R.C.S.

Burnham, Bucks, Sept. 15th, 1927.

THE SOLDIER'S LIFE IN GERMAN BARRACKS.

A VISIT to a barracks in Germany is reported in the *Military Surgeon* for August. The barracks was four-storied, the offices and stores being on the ground floor, and the dormitories above. These dormitories each held eight men: the walls were papered or brightly coloured with stencilled patterns, the windows had curtains, there were good pictures on the walls, the tables had tablecloths, and with their athletic trophies, books, and flowers the rooms suggested those of undergraduates rather than of soldiers. The men provide all these amenities at their own expense, but are encouraged by authority, as they now spend their evenings at the barracks in reading the books they thus have money to buy. In the rooms were washbasins, jugs, and slop-pails, and water was laid on in the corridor. The beds were spaced out as in the United States; the men had blue checked sheets, whilst the non-commissioned officers had white. Non-commissioned officers, and men awaiting promotion, had rooms by themselves, or shared with one other; no mention is made of the "Einjähriger" of old, who had better education and served only one year. There were comfortable reading and writing rooms for the companies. Heating was by stoves and ventilation was good. The kitchen and the men's dining rooms were in buildings separate from the dormitories and the food was excellent, being cooked usually by an N.C.O. and his wife. Beer and food were sold in the canteen for "other ranks." The men have four uniforms—a tailor-made full dress uniform and three working suits for drill, gymnastics, and fatigues. The old Prussian half-boot is still preferred, as it has no laces and is readily put on and off, making it easy to rest the feet. Much importance is attached to education which helps the men to get employment on discharge. The largest class, 120 men, was learning English, taught by conversational methods. Officers travel a great deal abroad, achieving this by economising on their mess expenses, which are not to exceed 2*s.* 6*d.* daily. The men also are encouraged to travel in Germany and abroad, and they do.

FLOWERS IN THE SICK ROOM.

To the Editor of THE LANCET.

SIR,—It is, I believe, generally accepted that growing plants give off oxygen and consume CO_2, and one may perhaps assume that cut flowers do the same, to a less extent. In this case both cut flowers and plants in pots would presumably be a useful acquisition to a hospital ward or sick room, and no one seems to contest this view in the case of the daylight hours; but there is a tradition amongst nurses that both flowers and plants should be removed at night, and I have heard it stated in support of this that the chemical interchange above referred to is reversed at night, oxygen being absorbed and CO_2 given off.

Could you or any of your readers kindly tell me what the actual facts are in this matter, and let me know of any references bearing on it?

I am, Sir, yours faithfully,

August 8th, 1927. ABALONE.

*** The facts about the influence of daylight on the respiration of plants are, we believe, as our correspondent states. But it seems very doubtful whether they can in any way explain what is always a point in good nursing practice. No reasonable amount of vegetation could make a perceptible difference in the composition of the air in a well-ventilated sick room. But few people find pleasure in the atmosphere of a room which is heavy with the smell of flowers and plants. A brief contact with it is a refreshing help in sickness and a good morning stimulus is missed if flowers are left in the room all night. At night, too, they are invisible, which halves the delight they can give.—ED. L.

PUBLIC HEALTH IN MOROCCO.

IT is reported that famine and typhus in the region of Agadir are causing anxiety to the French administration in Morocco, but an article by Dr. J. Colombani in the *World's Health* for August makes it clear that such outbreaks are foreseen and can be dealt with. Marshal Lyautey, resident-general from 1912 to 1925, recognised the doctor in a colony as an agent of penetration, pacification, and conciliation, and appointed a medical man as director of health and medical supply. Under him are 45 army doctors, most of them in the frontier zones, and 85 civilians, usually in the towns. These staff the hospitals throughout the Protectorate. Fifteen mobile military medical columns, each with a doctor, carrying drugs, serums, and vaccines, are sent through the less settled districts as arranged by the provincial health officers, and are available in emergencies such as the present. Much attention is given to malaria and typhus; there is an antirabic institute; the health of the ports is safeguarded, and there are four tuberculosis dispensaries with a specialist in charge. Madame Lyautey originated child welfare work in Rabat and it has spread all over the country; antenatal clinics, maternity hospitals, infant clinics, milk stations, creches, and preventoriums against tuberculosis are in full swing, and midwives are being trained.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, Sept. 19th, to SATURDAY, Sept. 24th.—WESTMINSTER HOSPITAL, S.W. Course in Medicine, Surgery, and the Specialties. All day course, consisting of lectures, demonstrations, and operations.—ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, Great Portland-street, W. Course in Orthopædics. All day, consisting of lectures and clinical demonstrations and operations.—QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, E. Course in Diseases of Children. All day, consisting of lectures, demonstrations, and operations.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, King William-street, W.C. Course in Ophthalmology. Afternoons, clinical instruction at 2 P.M. Operations at 3 P.M. Special demonstrations at 5 P.M.—BETHLEM ROYAL HOSPITAL, St. George's Fields, S.W. Psychological Medicine, Tuesdays and Saturdays at 11 A.M. Further information from the Secretary, Mayfair 2236.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Sept. 19th.—2.30 P.M. to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 P.M. to 5 P.M., Medical, Surgical, Throat, Nose, and Ear Clinics. Operations.

WEDNESDAY.—2.30 P.M. to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinic. 2.30 P.M. to 5 P.M., Medical, Surgical, and Ear, Nose, and Throat Clinics. Operations.

FRIDAY.—10.30 A.M., Throat, Nose, and Ear Clinics. 2.30 P.M. to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.